Russian and Ukrainian Literature on the Gypsy Moth: An Annotated Bibliography

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CONTENTS

SSSR: lesnaya entomologiya. Materialy X s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Leningrad: 29-31.
ECentral; HEMOLYMPH

336 Golutvin, G.I. 1983.
The effect of industrial pollution on some dendrophilous insects. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. (4):127-128.
-- Gypsy moth larvae have lower survival and fecundity on food taken from areas contaminated by metallurgic factories.
ESiberia; AIR POLLUTION, DEVELOPMENT

337 Gorbunov, A.F., Mishnev, A.K. 1983.
Leaf eating forest pests south of the Ukraine. Lesovodstvo i agroleso-melioratsiya. 66:53-58.
-- Studies of the biological peculiarities of the most widespread and important phyllophagous pests of forest stands are presented. Outbreaks of the gypsy moth, the browntail moth, the fall webworm, the satin moth and other phyllophages annually occur in stands of different species composition. Predators, parasites and diseases play an important part in decreasing the numbers of pests at all life stages. Spraying of oak stands with 0.5 % aqueous suspension of dendrobacillin contributes to a 75-90 % decrease of phyllophagous pests.
EWest; ECOLOGY, MICROBIAL PESTICIDES, PEST LIST

338 Gornostaev, G.N. 1962.
Mass flight of the gypsy moth, *Lymantria dispar* L., to mercury lamps in Moscow Province. In: Byulleten' Moskovskogo obshchestva estestvoispytateley. Otdeleniye biologii. MOIP, Moskva: 126.
-- In 1958, for the first time, large-scale flight of gypsy moth adults attracted to ultraviolet lamps was observed in Moscow Province. Flight began on July 24, 1958, reached its peak on July 25, 1958, and was completed on August 30, 1958; 1478 specimens (35.3% females) were observed. It was concluded that ultraviolet lamps can be used for eradication measures.
ECentral; FEMALES, FLIGHT, LIGHT TRAPS, PHENOLOGY

340 Gorokhov, V.A. 1972.
Sanitary condition and management of forests in the Voronezh region. In: Nauchnyye trudy Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk. Zashchita lesa ot vrediteley i bolezney. Moscow: 18-23.
-- The stands of the Voronezh Province lie in an area of continuous outbreaks of phyllophagous insects, the gypsy moth included. An outbreak was recorded here in 1968-1972. By 1972, foci remained only in an area of 334 ha. Oak mortality is mainly the result of anthropogenic impact and not phytophage activity.
ECentral; OUTBREAKS, TREE HEALTH

339 Gorokhov, V.A., Karlenko, V.M. 1980.
A biological method for controlling the gypsy moth, *Lymantria dispar*, a pest of conifers in the Voronezh Region, RSFSR. Lesnoye khozyaystvo. (5):50-52.
-- Light surveys supported the evidence of wide dispersal of gypsy moth males along rivers. In the Teliciman forest, dendrobacillin was applied against the gypsy moth. Its efficiency was 44% to 64%.
ECentral; FLIGHT, LIGHT TRAPS, MALES, MICROBIAL PESTICIDES

341 Grafov, J.A. 1967.
The application of attractants for insect pest control. Lesnoye khozyaystvo. (2):62-64.
-- A conventional pheromone trap to control the gypsy moth is used.
PHEROMONE TRAPS

342 Grechkin, V.P. 1956.
Some of the main representatives of insect pests in the mountain forests of Tadjikistan. Zoologicheskiy zhurnal. 35(10):1476-1492.
-- Mountain forests of Tadjikistan contain more than 120 tree and shrub species. Due to an acute shortage of moisture in summer and the age-long predatory activity of man (cuttings, cattle grazing), stands here are open or represented by individual trees scattered over slopes. Of the 20 species of the main phyllophages, the most serious are the fruit moth (*Hyponomeuta paclellus* L.), the mountain tent caterpillar, (*Malacosoma parallela* Stagr.), and the gypsy moth (*Ocneria dispar* L.). They heavily attack wild fruit species such as alycha, apple, pear, and hawthorn, sometimes completely defoliating them. A gypsy moth outbreak was recorded in 1951-1954 and, as a result of defoliation, there was no wild fruit at all. In the mountains of Tadjikistan, the gypsy moth also attacks *Acer turkestnus* Kom., *A. regelii pax*, *Populus tadschikistanica* Kom., *P. nivea* Willd., and *Myricaria alopecuroides* Schrenk. English walnut was attacked slightly. Stand differences were observed in pest egg mass deposition. In *P. nivea* stands, females oviposited mainly at a height of 3-4 to 8-10 m, usually on the underside of thick branches. In valleys, masses were deposited mainly at the trunk base.
MAsia; HOST PLANTS, OVIPOSITION SITE

343 Grigoryan, Ye.G., Azaryan, G.K., Davtyan, L.T. 1984.
The use of two inhibitors of chitin synthesis against gypsy moth and the tent caterpillar larvae. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 127-128.
-- In the laboratory, the effect of Dimilin and BAU-8514 at different concentrations was studied. The food of tent caterpillar and gypsy moth larvae was treated with Dimilin and BAU-8514 for 3 days. The food for control larvae was treated with water. Dimilin and BAU-8514 was highly lethal for larvae of both species. A few days after treatment, larvae stop feeding, grew black and died while molting. Preparations have a long-term effect as well because moths die while emerging or are non-viable.
Caucasus; BIOASSAY, GROWTH REGULATORS

344 Grigoryan, Ye.G., Sarkisyan, M.A., Devtyan, L.T. 1988.
Combined application of bacterial preparations and

Inhibitors of chitin synthesis against gypsy moth. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 37-38.
-- Studies were made to find the minimum effective doses of the bacterial preparations gomelin, dendrobacillin, and the inhibitors of chitin synthesis, alsitin and Dimilin, applied in combination against gypsy moth larvae. Experiments were made in the laboratory and in the field on larvae of different instars; 20 combinations of the preparations were tested and water was used as the control. Preparation efficacy was estimated by the Abbot formula. Statistical processing was made according to Ashmarina and Vorobyeva (1962). Normality of sampling distribution was made by Shoven criterion. Laboratory experiments showed 100-80% mortality of instars III to V by combinations of bacterial preparations and minimum doses of alsitin (0.00025%) or Dimilin (0.005%).
Caucasus; BACTERIA, BIOASSAY, GROWTH REGULATORS, MICROBIAL PESTICIDES, NUMERICAL DATA

345 Grimalskiy, V.I., Lozinskiy, V.O. 1976.
Effect of hill ants on gypsy moth abandance. Zakhyst roslin. 23:11-16.
-- Surveys of gypsy moth foci showed the aggressive ant, *Formica polyctena* Forst., to be an inefficient entomophage of the gypsy moth. Ants attack injured, diseased, and parasitized larvae and, very rarely under experimental conditions, kill healthy instars II to VI. There were very few egg masses near ant hills; this is not a result of their destruction, but because females disturbed by ants migrate to quieter locations for oviposition. Because larvae are dispersed by wind, population density in pest foci is not affected.
EWest; OVIPOSITION BEHAVIOR, PREDATORS

346 Grimm, O. 1874.
***Liparis dispar* L.** In: Nasekomyye i ikh znacheniye v sel'skom khozyaystve. St. Petersburg: 27-31.
-- In some regions of the European part of Russia, gypsy moth outbreaks occurred in 1847-1848, 1852, 1862-1864, 1866-1869, 1870-1871. These populations were suppressed by entomophages and diseases. Pest adults and larvae are described briefly.
EWest, ECentral; OUTBREAKS

347 Gromova, A.A. 1976.
Effect of density on growth and development of some tussock moth species. In: Sovremennyye problemy zoologii i sovershenstvovaniya metodiki eye prepodavaniya v VUZe i shkole. Perm: 61-62.
-- Gypsy moth larvae that hatched from egg masses collected in nature were placed into glass vessels with a volume of 91 ml, 1 to 5 larvae per vessel, and fed apple leaves. Food was changed daily. The following parameters were measured: diel feeding activity and food utilization, feeding and duration of development, pupal and larval weight, male-female ratio, and fecundity. In the experiments, feeding activity, pupal weight, and fecundity decreased with increase in larval density. Feeding dynamics reflected general regularities in tussock moth feeding. Maximum and minimum amounts of food were, as a rule, consumed on the same days at different density levels. Density effect is thought to be related to the effect of excretory products.
ECentral; BEHAVIOR, DENSITY, ENERGETICS, FEEDING, REARING

348 Grossgeim, N.A. 1931.
The gypsy moth, *Porthetria dispar* L. In: Sadovyye vrediteli. Kharkov: 82-84.
-- All the life stages of the pest are described (illustrations are provided) and principal data on gypsy moth biology and ecology are presented. Pest control measures for gardens such as collection of egg masses and treatment with petroleum, application of sticky belts, digging of grooves to trap migrating late instars, and application of intestinal insecticides are suggested.
ECentral; CONTROL, GENERAL BIOLOGY, LIFE STAGE DESCRIPTIONS

349 Grossgeim, N.A., Pyatakova, V.L. 1928.
Preliminary list of insects damaging fruit crops at the Mleev research station (in 1923-1927). In: Trudy Mleevskoy sadovo-ogorodnoy opytnoy stantsii. Kharkov: 1-63.
-- The gypsy moth is listed among 310 insect species of various orders and families that are pests of fruit species.
EWest; PEST LIST

350 Gukasyan, A.B. 1988.
Microbiological forest protection against gypsy moth. In: Neparnyy shelkoptyad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 36-37.
-- Sporiferous and sporeless pathogen forms, viruses, and fungi were studied as microbiological agents. Fungal preparations are extremely slow to act in mountain forests; sporiferous forms of bacteria cannot be used as pathogens due to their intolerance for the conditions of production technology. Viral preparations are the most promising but their production also is complicated. Integrated protection using highly efficient pathogens (bacterial, fungal, viral, and ectinomyceta), plays a specific part in gypsy moth control. Application of microbiological control methods strengthens natural factors of pest mortality enhancing the effect of other negative factors. Crystaliferous entomopathogenic sporiferous microorganisms introduced into the forest biocenosis for its protection adapt to environmental conditions, and can be active for a long time causing continual interaction of foci.
WSiberia; BACTERIA, FUNGI, MICROBIAL PESTICIDES, VIRUS

351 Gukasyan, V.M. 1967.
Microbiological control of the gypsy moth. In: Itogi izucheniya lesov Dal'nego Vostoka. Vladivostok: 283-284.
-- More than 10 species of crystal-forming bacteria were tested against various gypsy moth instars. Younger larvae and larvae before pupation were the most sensitive to preparations: up to 58-97% died. Bacteria were found to remain viable in the soil for some years.
WSiberia; BACTERIA, MICROBIAL PESTICIDES, SOIL

352 Gukasyan, V.M. 1968.
Application of entomopathogenic microorganisms for gypsy moth control. In: Izvestiya biologo-geographicheskogo NII pri Irkutskom universitete. Irkutsk: 158-164.
-- Different strains of 10 *Bacillus* species were used as pathogens of gypsy moth diseases. A combination of separate elements of the bacteriological method was found which had maximum biological and economic efficacy. In different variants of the experiment, larval mortality ranged from 58% to 97% vs 1% in the control; pupal mortality was 70% to 80% of the insects that had reached this stage. On the whole, the bacteriological method of gypsy moth control was regarded as effective. The most virulent bacterial cultures were *Bacillus insectus* Guk., *B. dendrolimus* Tal., and *B. thuringiensis* (strain 811).
WSiberia; BACTERIA, BIOASSAY, MICROBIAL PESTICIDES

353 Gukasyan, V.M. 1968.
Bacteriological method of gypsy moth control. Avtoreferat dissertatsii kandidata biologichekikh nauk. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk. 24 p.
WSiberia; BACTERIA, MICROBIAL PESTICIDES

354 Gukasyan, V.M., Saaya, B.I., Sarkisyan, M.A., Goginashvili, N.V. 1988.
Microbiological control of gypsy moth in coniferous and broad-leaved forests. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 38-39.
WSiberia; MICROBIAL PESTICIDES

355 Guliy, V.V. 1981.
Microorganisms in crop protection. Zashchita rasteniy. (8):48-49.
-- Bacterial preparations were applied; efficiency was about 90%.
WSiberia; BACTERIA, MICROBIAL PESTICIDES

356 Guliy, V.V., Golosova, M.A. 1975.
Application of viruses for forest protection against insect pests. (Ispol'zovaniye virusov v zashchite lesa ot vrednykh nasekomykh.) Lesnaya promyshlennost', Moscow. 226 p.
-- The role of entomopathogenic viruses for control of some phytophagous insects, including the gypsy moth, is discussed. Peculiarities of pathogenesis and epizootiology of diseases of these pests are shown. Particular emphasis is placed on practical application of pathogens in phytophagous pest control. Some principles on work with various groups of entomopathogenic viruses in connection with their application in forest protection are presented.
MICROBIAL PESTICIDES, REVIEW, VIRUS

357 Guliy, V.V., Teplyakova, T.V., Ivanov, G.M. 1981.
Microorganisms applicable in biological control method. (Mikroorganizmy. poleznyye dlya biometoda.) Nauka, Novosibirsk. 271 p.
-- Data on viruses, rickettsiae, bacteria, and fungi attacking various pests, including the gypsy moth, are presented. The gypsy moth is attacked by *Baculovirus stipnotiae, B. reprimens, Densovirus junonia, Insectoreovirus disparis,* and *I. rotunda.*
REVIEW, VIRUS

358 Gul'ko, A.G. 1979.
Materials on primary toxicological tests of disparlure in trials with warm-blooded species. In: Novyye metody v zashchite rasteniy. Shtiintsa, Kishinev: 36-39.
-- Disparlure toxicity for mice and rats was examined by single and multiple per os administration and application to the skin. Investigations were carried out according to "Instruction on Hygienic Assessment of New Pesticides" (1969). For single per os administration, the doses ranged from 1 to 10 g/kg of live weight. Pathological response, observed over a 24 hour period, indicated that animals did not die. When the preparation was applied over a longer period of time (4 months) in three groups, 60%, 70%, and 80% of the animals died. Single doses were 0.1, 0.5, and 1 g/kg, and total doses 2.75, 17.386, and 25.284 g/kg of live weight. When the preparation was applied to the skin, no deviations from the norm were observed. The preparation has a low toxicity for warm-blooded animals.
EWest; BIOASSAY, PHEROMONES, TOXICOLOGY

359 Gur'ev, A.N. 1970.
Effect of some phytoncids and their analogues on the silkworm, *Bombyx mori* L., and the gypsy moth, *Porthetria dispar* L. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Kiev. 26 p.
-- Studies were conducted to find the most active agents possessing both stimulative and insecticidal properties among 115 phytoncide preparations. When treated with analogues of pseudoallicin, insects respond in the same way as when treated with insecticides: the percentage of macronucleocytes decreases and the functioning of the larval neurosecretory system is upset. It should be emphasized that the gypsy moth has an aversion to food treated with pseudoallicins. All this causes slower development, decline in fecundity and, eventually, death. Thus, these preparations should be regarded as promising for plant protection.
EWest; BIOASSAY, NATURAL PLANT PRODUCTS

360 Gur'ev, A.N. 1981.
Insecticidal effect of some aquatic and hydrophilous plants on gypsy moth. In: Fitontsydy. Kiev: 310-312.
-- The effect of sap from 10 aquatic and hydrophous plants on the gypsy moth was studied. Mortality, the weight of surviving pupae, and adult fecundity were observed. Water lily and veratrum had marked insecticidal properties. These plants caused 55% to 60% mortality of larvae and reduced weight and fecundity compared to the control.
EWest; NATURAL PLANT PRODUCTS

361 Gur'ev, A.N., Bogdan, N.P. 1968.
Effect of some pseudoallicins on gypsy moth vitality. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USGA, Kiev: 97-99.
-- Apple leaves treated with dilute solutions (1:250) of

pseudoallicins (Nos. 150, 232, 276, and 356) were fed to gypsy moth larvae. The most pernicious effect on larvae was produced by pseudoallicins 150 and 256 (survivorship in the experiment was 15-26 % vs 90-94 % in the control). Adult fecundity also was considerably reduced.
EWest; BIOASSAY, NATURAL PLANT PRODUCTS

362 Gur'ev, A.N., Kushvid, F.I. 1976.
A comparative estimation of the effect of a preparation of Haplophyllum obtusifolium and chlorophos on the sorption properties of intestinal walls in gypsy moth. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Teoriya i praktika povysheniya produktivnosti sel'skokhozyaystvennykh zhivotnykh. USKhA, Kiev: 124-125.
-- By the quantitative method of vital staining with neutral red, a stimulative effect of *Haplophyllum obtusifolium* phytoncide was found on the sorption activity of isolated gypsy moth intestines. Activity increased with longer tissue exposure to the preparation (1.3 and 6 hours). Under the action of chlorophos, some increase in intestine sorption activity was observed. As compared to the control, about 130% of the stain remained in the tissue after being in the pesticide solution for an hour; but, 6 hours later intestine sorption activity declined drastically to the value of the control parameter. Similar properties of the preparation under study were found in the experiments on silkworm intestine that had not been isolated.
EWest; CHEMICAL INSECTICIDES, HISTOLOGY, NATURAL PLANT PRODUCTS

363 Gur'ev, A.N., Kushvid, F.I. 1976.
Development of polyhedrosis in gypsy moth through volatile phytoncides of some plants. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Zashchita rasteniy ot vrediteley i bolezney. USKhA, Kiev: 30-31.
-- Instars I to III fed on food treated with virus suspension were infected with polyhedrosis. After molting, infected larvae were kept in special two-story cages with air flow bringing in phytoncides of the following plants: *Mentha arvensis L., Cannabis sativa, Daucus sativus* (Haft.), Roehl., *Raphanus sativus* var. *niger* Rers., *Allum sera* L., *Tagetes patula* (*Artemisia absinthium*), *Thuja occidentalis* L., and *Anethum graveolens*. Against the background of volatile phytoncides of all the species (except *Tagetes patula*), duration of disease development was reduced to 7.83-14.0 days vs 17.67 days in the control for larvae infected in the first instar. Late instars appeared more tolerant but, in most cases, phytoncides served as the factor causing predisposition to diseases. Phytoncides of *Raphanus sativus* and *Thuja occidentalis* had the most suppressive effect on all instars of gypsy moth.
EWest; NATURAL PLANT PRODUCTS, VIRUS

364 Gur'ev, A.N., Kushvid, F.I. 1977.
Development of polyhedrosis in gypsy moth larvae when treated with phytoncidal preparations. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Zashchita rasteniy ot vrediteley i bolezney. USKhA, Kiev: 10-12.
-- Phytoncides of 7 different plants were studied as possible agents contributing to polyhedrosis development. Of all the phytoncides, only the preparation extracted from *Iris songarica* Schrenk. contributed to accelerated development of disease and higher mortality of gypsy moth larvae (99% vs 81% in the control). Mortality was significant from the 5th to the 15th day of the experiment. In this period, 71% of the larvae died vs 41% in the control. Thus, phytoncides should be looked upon as an additional source of insect control.
EWest; NATURAL PLANT PRODUCTS, VIRUS

365 Gur'ev, A.N., Kushvid, F.I. 1978.
Effect of the phytoncide Haplophyllum obtusifolium on gypsy moth infected with polyhedrosis. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Zashchita rasteniy ot vrediteley i bolezney. USKhA, Kiev: 45-46.
-- Two sets of experiments were made. In one, gypsy moth larvae were infected with polyhedrosis in the second instar; in the other, they were infected in the fourth instar. On the second day after infection, larvae were fed apple leaves treated with Haplophyllum obtusifolium phytoncide solution at a concentration of 1:500. Larvae started dying as early as a few hours after the first application of the phytoncide preparation. In the first set of experiments, 100% mortality was recorded on the 17th day; in the control, 84% of the larvae died within 36 days. In the second set of experiments, parameters were 84% within 13 days and 29% within 15 days, respectively. Thus, application of Haplophyllum obtusifolium phytoncide weakened insect organisms considerably and provoked a more acute course of nuclear polyhedrosis.
EWest; BIOASSAY, NATURAL PLANT PRODUCTS, VIRUS

366 Gur'ev, A.N., Morozov, N.S. 1978.
Dynamics of blood-forming activity in the gypsy moth, *Ocneria dispar* L., when treated with European elder sap and chlorophos. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Zashchita rasteniy ot vrediteley i bolezney. USKhA, Kiev: 52-54.
-- A new method for estimating blood-forming activity of larvae is suggested. It consists of heavy blood letting and measuring the number of forming elements in 1 ml of hemolymph at regular intervals with a Goryachev chamber, which is used in medicine. The method is tested on gypsy moth larvae subjected to the action of elder juice and chlorophos. In bled larvae reared under normal conditions, the original number of hemocytes is restored within 9 hours. Larvae treated with elder juice or chlorophos when bled achieved restoration of only 82% of hemocytes after 15 hours; the number of hemocytes begins to decline and, by the end of a 24-hour period, it is 70%.
EWest; CHEMICAL INSECTICIDES, NATURAL PLANT PRODUCTS, PHYSIOLOGY

367 Guseinov, Ye.S. 1973.
Gypsy moth in the forests of Azerbaijan. Zashchita rasteniy. (5):33.
-- In 1971-1972, a gypsy moth outbreak occurred in

Azerbaijan over about 50,000 ha of oak-hornbeam stands. Adult flight was observed in the first half of July. The number of egg masses ranged from 5 to 100 per tree, and egg masses were deposited on trunks and branches along the entire height of trees. Most of the egg masses were deposited at the trunk base, on stones, clods of earth, stumps, houses, fences, leaves, and in the litter. Egg mass sizes ranged from 800 to 1500 eggs. Larvae hatched in late April or early May and were dispersed by wind. The favored food plants were oak and hornbeam; ash, ash-leaved maple, and English walnut were slightly attacked, while Bastard acacia was not attacked by larvae at all. The most active parasites were *Carcelia excisa* and *Parasarcophaga portschinskyi*. The outbreak was suppressed by aerial treatments of chlorophos and hexachloran.
MAsia; CHEMICAL INSECTICIDES, FECUNDITY, HOST PLANTS, OVIPOSITION SITE, PARASITES

368 Guseinov, Ye.S., Mirzoev, J.A. 1976.
Folivorous pests and their control in the forests of Azerbaydzhan. In: Ispol'zovaniye khimicheskikh i biologicheskikh sredstv v bor'be s vreditelyami lesa. VNIILM, Pushkino: 37-38.
-- In valley and foothill forests of Azerbaijan, great numbers of some lepidopterous pest species are found. The gypsy moth and the geometrids, the winter moth, chevron, and scribber are the main pests. The gypsy moth is recorded annually in an area of more than 200,000 ha but rarely occurs at heights above 500-800 m. Gypsy moth and geometrid foci are formed in mixed stands of hornbeam, oak, and wild fruit trees. In the sites completely defoliated in 2-3 years, oak died or nearly died, especially after droughts. Control measures such as aerial treatments with chlorophos, and ground spraying with phosalon, ftalophos, and sevin were used. Pesticide treatment covers not less than 200,000 ha per year. Since 1975, testing of Virin-ENSh against the gypsy moth has been started. The positive effect is significant.
Caucasus; CHEMICAL INSECTICIDES, MICROBIAL PESTICIDES, VIRUS

369 Guzeev, G.F. 1986.
Microbiological preparations for control of defoliating insects in the pistachio forests of Middle Asia. Lesnoye khozyaystvo. (10):63.
-- Dendrobacillin, toxibacillin, and lepidocide are used against the gypsy moth. Gomelin appears to be the most effective preparation.
BACTERIA, MICROBIAL PESTICIDES

370 Ibragimova, K.N. 1969.
Insect pests in Kirgiziya. In: Trudy XIII Mezhdunarodnogo entomologicheskogo kongressa. Nauka, Moscow: 40-41.
-- One hundred sixty-three insect species trophically related to willow have been registered; among polytrophic phyllophages the gypsy moth is of great importance.
MAsia; PEST LIST

371 Idiyatulin, R.M., Amirkhanov, D.V., Tur'yanov, P.A. 1978.
New insecticides used against gypsy moth. Lesnoye khozyaystvo. (11):85-86.
-- Action of organic phosphorous insecticides on the gypsy moth was studied at Bashkir Forest Experimental Station in 1976. Vinylphosphate was found to be the most effective; basudin was highly effective for only a short time.
EEast; CHEMICAL INSECTICIDES, NUTRITION

373 Idrisova, N.T. 1976.
Importance of various biotic factors in reducing the gypsy moth number. In: Biologicheskiye osnovy i ratsional'noye ispol'zovaniye pochv i rastitel'nykh resursov Bashkirii. Ufa: 62-64.
-- A procedure for investigating gypsy moth population density from 1971-1975 is presented. Factors were evaluated using the Bess coefficient. Decrease in population density in three sites was mainly due to diseases (primarily polyhedrosis) and parasites.
EEast; POPULATION DYNAMICS

372 Idrisova, N.T. 1977.
Materials on biology and ecology of the gypsy moth in Bashkirian ASSR. In: Nasekomyye - vrediteli lesov Bashkirii. Ufa: 38-54.
-- In studies of the gypsy moth from 1971-1975, egg hatch was found to occur when birch and oak come into leaf at a mean daily temperature of 10.6-10.8 C and at a sum of effective temperatures of 168.7 - 210.0. On the average, larval development lasts 59 days and pupal development lasts 14.2 days. Sums of mean daily temperatures were 922.5 and 279.8, respectively. Life tables of gypsy moth generations were made for a period from 1972 to 1975. Using the Bess coefficient, it was found that the key mortality factors were diseases (principally polyhedrosis) and parasites (*Anilasta tricincta* and *Phorocera silvestris*).
EEast; EGG HATCH, PARASITES, PHENOLOGY, TEMPERATURE

374 Idrisova, N.T. 1977.
New gypsy moth outbreaks in Bashkiria. In: Nasekomyye - vrediteli lesov Bashkirii. Ufa: 26-37.
-- The latest increase in gypsy moth numbers began in Bashkiria in 1971. Foci of gradation are closely related to the major food species--oak and birch. From 1972 to 1975, the area of pest foci increased considerably, spreading to the northern and northwestern regions of the republic. It is suggested that one of the main conditions of rapid gradation in these years is a strong correlation between the time of egg hatch to the time of oak and birch coming into leaf.
EEast; EGG HATCH, NUMERICAL DATA, PHENOLOGY

375 Idrisova, N.T. 1978.
Method of inventory of the gypsy moth egg masses in Bashkiria. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. Voprosy zashchity lesa. MLTI, Moskva: 48-55.
-- Types of gypsy moth egg mass distribution were studied at permanent experimental plots in some forestries in Bashkiria by counting all the pest egg masses in 1974-1976. Egg masses are highly aggregated and, in most cases, actual distribution patterns cannot be

described with Poisson distribution. Distribution is not random (aggregated) and is described using the exponential curve of the negative binomial. When egg masses are aggregated the best strategy for making counts is to reduce the amount of samples from one tree while increasing the number of sample trees. Thus, it is suggested that egg masses should be counted on one side of the tree.
EEast; EGG MASSES, SAMPLING

376 Idrisova, N.T. 1981.
Role of biotic factors in gypsy moth population dynamics. In: Zashchita lesa v Bashkirii. Ufa: 29-30.
-- Total generational mortality is determined mainly by mortality in the larval stage; in particular, death of instars III to VI has the strongest correlation to total generational mortality. Larval mortality is generally caused by diseases. In some years there was correlation between total pest mortality and mortality at egg and pupal stages. In Bashkiria, death of insects at these stages is mainly caused by diseases, and most commonly by polyhedrosis. In Bashkiria, it is advisable to take measures to increase mortality of early instars by activating the latent form of polyhedrosis using virus preparations.
EEast; POPULATION DYNAMICS, VIRUS

377 Idrisova, N.T. 1981.
Factors of gypsy moth mortality in Bashkiria. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnius: 59-61.
-- Regions west of the Urals and the South Urals were surveyed. Early instars proved to be the most sensitive.
EEast; MICROSPORIDIA

378 Idrisova, N.T. 1983.
Biology, ecology and population dynamics of gypsy moth in Bashkiriya. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Moscow. 20 p.
-- Data are presented on peculiarities of Bashkirian populations of the gypsy moth such as phenology, population dynamics, the impact of entomophages, diseases, and abiotic factors of Baskirian populations of the gypsy moth. The application of these in pest control is also given.
EEast; CONTROL, PHENOLOGY, POPULATION DYNAMICS

379 Idrisova, N.T., Yafaeva, Z.Sh. 1981.
Phenology of the gypsy moth in Bashkirian ASSR. In: Zashchita lesa v Bashkirii. Ufa: 37-39.
-- In Bashkiria, gypsy moth egg hatch usually coincides with trees coming into leaf (usually early May); weather conditions can prolong hatching to 2 weeks. Leafing generally occurs at the time of hatch but birch sometimes comes into leaf before egg hatch. Birch is the species preferred for oviposition and tree infestation is directly related to trunk diameter. Duration of larval and pupal development and adult flight ranged from 59 to 73 days. Adults usually emerge by mid-June, with flight lasting an average of 32 days. The survey period is from 1953 to 1980.
EEast; DEVELOPMENT, EGG HATCH, PHENOLOGY

380 Ierusalimov, Ye.N. 1979.
Disturbance in physiological processes of the trees infested by defoliating insects. Lesovedenie. (2):62-71.
-- Changes in respiration, transpiration, and bleeding sap transport were studied in some conifers infested by the Siberian moth and in English oak infested by the gypsy moth. Changes were noted in normal respiration of tree trunk and branches, which is specific for each species and tree size. A positive balance of photosynthesis in oaks was observed when 0.3% of foliage biomass was restored, but disappeared as leaves were attacked by true mildew. Decreased respiration intensity of oak trunks was observed for not less than 2 years. When tree trunks were dying, their gas exchange changed sharply. Bleeding sap transport did not cease in oaks attacked by the gypsy moth as contrasted to firs.
ECentral; DEFOLIATION, TREE HEALTH

381 Ierusalimov, Ye.N. 1982.
Changes in the growth of oak, pine-oak and birch stands damaged by gypsy moth. In: Morpho-ekologicheskiye adaptatsii nasekomykh v nazemnykh soobshchestvakh. Nauka, Moscow: 94-99.
-- A single attack of oak crowns by gypsy moth larvae resulted in a decrease of annual increment, which averaged 50% of the increment expected. For two successive years the summary annual increment was lost. In mixed stands, pine was free from gypsy moth attack and had a 1.5-2 time increase in increment on the third and fourth year. In mixed forests, this increase compensated for the loss of increment in oak.
ECentral; STAND COMPOSITION, TREE GROWTH

382 Ierusalimov, Ye.N. 1988.
Storage substances occurring in tissues of an oak tree damaged by phytophages. Lesovedenie. (5):9-14.
-- Dynamics of accumulation of storage nutrients in tissues of oak, the leaves of which were attacked by the green oak leaf roller and the gypsy moth were studied in Krasnodar Krai. It was found that leaf damage caused by phyllophages not only exhausts non-nitrogenous substances in the tree, but also upsets the regulation of their distribution and use.
ECentral; TREE HEALTH

383 Il'ichev, A.L. 1981.
Reaction of gypsy moth males to Disparlure, a synthetic sexual attractant. Zashchita rasteniy. (7):32.
-- The response by males to the odor of the sex attractant, Disparlure, was observed. Four consecutive stages of sexual excitement were distinguished with sequential increase of attractant concentration. Very high concentrations (3-5 mkg/ml) cause high excitement of the male almost immediately, followed by a long period of depression with no response to disparlure. This may explain the drastic decline in the trapping ability of pheromone traps containing excessive attractant.
ECentral; BEHAVIOR, PHEROMONES

384 Il'inskiy, A.I. 1952.
Gypsy moth. In: Nadzor za khvoe-i listogryzushchimi vreditelyami v lesakh i prognoz ikh massovykh razmnozheniy (nastavleniye). Goslesbumizdat, Moscow

and Leningrad: 90-93.
-- Data are presented from regions where gypsy moth outbreaks occur, including an ecological description of locations where primary foci originate and the general duration of outbreaks. Brief descriptions are given of ecological peculiarities of the species and characteristics to identify the pest in its foci and to forecast foci dynamics.
FOCI, OUTBREAKS, PROGNOSIS

385 Il'inskiy, A.I. 1959.
Gypsy moth and its control. (Neparnyy shelkopryad i ego kontrol'.) Goslesbumizdat, Moscow. 63 p.
-- The area of gypsy moth gradation and zones inside the area are studied. Vast evidence on species ecology and its role in biocenoses is presented along with a list of food plants preferred in different parts of the area. Included is a list of gypsy moth entomophages that includes 15 species of predators, 134 species of primary parasites, 27 species of secondary parasites, and 14 species of pathogens. In the last chapter, regularities of changes in gypsy moth population dynamics are outlined.
HOST PLANTS, PARASITES, PATHOGENS, POPULATION DYNAMICS, PREDATORS, REVIEW

386 Il'inskiy, A.I. 1961.
Inventory of folivorous insects in the forests and prediction of their outbreaks. In: Zashchita lesov ot vrediteley i bolezney. Moscow: 57-96.
-- This is a detailed analysis of the occurrence and the dynamics of outbreaks of some important phyllophages, including the gypsy moth. Information on outbreaks of gypsy moth and other pests in the European part of Russia is given for the period from 1890 to 1936. An assessment of effect produced by weather conditions, an analysis of correlation between outbreaks and droughts, and between the number of pests and food plant condition is presented. Theoretical and practical foundations of forecasting and controlling phyllophage populations with regard to activity of biological agents (entomophages and diseases) also is included.
ECentral; POPULATION DYNAMICS, PROGNOSIS, WEATHER

387 Il'inskiy, A.I. 1965.
Gypsy moth. In: Nadzor, uchet i prognoz za massovymi khvoye- i listogryzushchimi nasekomymi. Lesnaya promyshlennost', Moscow: 278-286.
-- A general description of the species, its role in biocenoses, its area, zones of damage, and the role of biotic and abiotic factors in regulating pest numbers are given. A list of food plants is included and gypsy moth population dynamics is discussed.
DEVELOPMENT, GENERAL BIOLOGY, HOST PLANTS, REVIEW

388 Il'inskiy, A.I. 1965.
Abundant folivorous insects: management and prediction. (Nadzor, uchet i prognoz za massovymi khvoye- i listogryzushchimi nasekomymi.) Lesnaya promyshlennost', Moscow. 525 p.
-- Data are presented on regularities of outbreaks, procedures of counts and control, methods for determining insect viability at all life stages, parasitism of entomophages, and infection with diseases. Techniques for pathogen extraction and identification, forecasting techniques, and control measures directed towards some phyllophage complexes, including the gypsy moth also are presented. Also included are morphological descriptions of pest life stages, data on biology, food plants, danger, frequency of outbreaks, places where primary foci originate, etc., for more than 100 species of phyllophagous insects, including the gypsy moth. The supplement contains catalogues of major parasites and diseases of important pest species and meteorological data for some localities. Pages 278-286 are devoted only to gypsy moth (see Il'insky, 1965), but information on gypsy moth also is included in other chapters.
CONTROL, OUTBREAKS, PROGNOSIS, REVIEW

389 Il'inykh, A.V. 1989.
Production of laboratory reared populations of the gypsy moth for virus production. In: Biologicheskiye i tekhnologicheskiye problemy sozdaniya virusnykh preparatov dlya integrirovannoy zashchity rasteniy. Novosibirsk: 25.
-- Cultivation of gypsy moth for virus production on a large scale is complicated because it is monovoltine and has a relatively long larval development period. In the laboratory, 4, 3 and 2 gypsy moth generations were produced using eggs from natural populations. Composition of nutrient medium and cultivation procedure are unique. It is suggested that large-scale production of viral material in laboratories should be made on larvae taken from gypsy moth gradation foci, while the laboratory material should be used for bioassays.
WSiberia; REARING, VIRUS

390 Il'inykh, A.V., Mokhovikov, S.M. 1989.
Development of initial gypsy moth colonies. In: Tezisy dokladov 2 Vsesoyuznoy konferentsii po promyshlennomu razvedeniyu nasekomykh. Nauka, Moscow: 87-88.
-- Weight of female pupae and fecundity of adults from certain foci are sufficient criteria for estimating insect populations for use in artificial breeding and for establishing research priorities.
ECentral; POPULATION QUALITY, REARING

391 Imnadze, T.S. 1981.
The use of new microbiological preparations against leaf-gnawing forest pests in Georgia. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnius: 62-64.
-- Bitoxibacillin and gomelin were applied against the green oak leaf roller and other geometrids. Within 3-4 days following treatment, 100% of the insects were dead.
Caucasus; BACTERIA, MICROBIAL PESTICIDES

392 Ingenitskiy, I.V. 1897.
Insect pests of Semirechje. (Nasekomyye-vrediteli Semirech'ya.) St. Petersburg. 132 p.
MAsia; PEST LIST

393 Ipat'eva, G.V., Mukhamedzyanova, F.V. 1976.
Dynamics of gypsy moth infection by mermithids (Mermethidae, Nematoda) in Bashkiria. In: Fiziologicheskaya i populyatsionnaya ekologiya

zhivotnykh. Izdatel'stvo Saratovskogo universiteta, Saratov: 53-63.
-- Analysis of mermithid infection of gypsy moth larvae in Bashkiria from 1964 to 1974 showed that it ranged from 0 to 22%. Sharp numerical fluctuations of mermithids were observed in different years in the same region and in the same year in regions differing in natural and climatic conditions (regarded as important for regulating mermithid population). Effectiveness of mermithids as a regulator of gypsy moth populations also is different.
ECentral; CLIMATE, NEMATODES

394 Issi, I.V. 1968.
Effect of a microsporidium on fecundity of the gypsy moth, *Lymantria dispar* L.(Lepidoptera, Orgyidae) in generations. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 331-339.
-- The effect of infecting gypsy moth instars III and V with the microsporidium *Plistophora schubegi* Zw. extracted from the browntail moth was studied. The following parameters were examined: growth dynamics of infected larvae under heavy and medium infection, pupal weight, and the number of eggs deposited. Also studied were parameters of offspring of healthy and diseased females, the mortality during the developmental period, the number of eggs deposited in the following generation, the average weight of an egg mass, and the total weight of the offspring. At early stages of disease, some stimulation of the host by the parasite was observed, i.e., the growth rate of parasitized insects was higher. After 6-10 days, diseased insects start lagging behind healthy ones in growth. Early infection leads to lower pupal weight and decline in adult fecundity by an average of 70%. If late instars are infected, an insignificant deviation of pupal weight and imago fecundity occurs in the first generation, but in the next generation mortality of infected female offspring is 10% to 15% higher than in the control and fecundity of adults produced by diseased females is 5 times lower than in the control.
ECentral; MICROSPORIDIA

395 Ivashov, A.V., Boyko, G.Ye., Simchuk, A.P. 1992.
Modification and utilization of the phenolic compounds in pubescent oak leaves by caterpillars of the oak leaf roller moth and the gypsy moth. Zhurnal obshchey biologii. 53(3):384-393.
-- Biochemical analysis of leaves of *Quercus pubescens* Willd. revealed 18 secondary metabolites, most of which were phenolic compounds. The percentage decrease of these compounds in the intestines and excrement of caterpillars of the monophagous leaf roller moth (*Tortrix viridana* L., Tortricidae) and the polyphagous *Lymantria dispar* L. was traced. The vast majority of the secondary metabolites of oak leaves were modified in the intestine of the leaf roller moth larvae. These modifications are reversible, and the same compounds as in the food were identified in caterpillar excrement. These modifications also are revealed in the case of the gypsy moth. Results indicate that multiple forms of the leaf roller's non-specific esterases act on a compound extracted from the oak leaves tentatively identified as kempferol-3-glucoside. Possible mechanisms of detoxication of the phenolic compounds in mono- and polyphages are discussed.
EWest; BIOCHEMISTRY, FOLIAGE CHEMISTRY, TOXICOLOGY

396 Ivashov, V.I., Ivlev, V.I. 1983.
Some peculiarities of gypsy moth interaction with nuclear polyhedrosis. In: Ekosistemy gornogo Kryma, ikh optimatizatsiya i okhrana. SGU, Simferopol: 111-115.
-- The effect of a nuclear polyhedrosis virus on gypsy moth larvae from a Moldavian population was studied in the laboratory. Mortality dynamics was studied by treating insects with doses of 1000 to 10,000,000 polyhedra per larvae. The data obtained were contradictory.
EWest; BIOASSAY, VIRUS

397 Izhevskiy, S.S. 1971.
Role of carbohydrases in carbon nutrition of the gypsy moth. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Moskow: 131-138.
-- Composition of gypsy moth carbohydrases and their role in digestion were studied. Four carbohydrases were found in different parts of gypsy moth larval intestines: glucosidase, galactosidase, fructofuranosidase, and amylase. The fact that these highly active digestive carbohydrases, which can readily hydrolyze oligosugars and starch, are found in the intestine means that these polysaccharides can be converted to monosaccharides and hence are a food resource. A conclusion can be made that this species is capable of utilizing a variety of plant carbohydrates and is not so dependent on the amount of monosaccharides in food as previously reported.
ECentral; BIOCHEMISTRY, ENZYMES

398 Izhevskiy, S.S. 1973.
Comparative analysis of alpha-amylase of the gypsy moth and the tent caterpillar. In: Biochemicheskaya evolyutsiya. Izd. AN SSSR, Leningrad: 33-38.
-- Considerable differences were found in the parameters of alpha-amylase extracted from the intestinal tissue of gypsy moth and tent caterpillar larvae reared under similar conditions and fed the same food. The maximum amylase activity of the tent caterpillar is observed at pH = 7.0 and a temperature of 62°C; for the gypsy moth it is pH =9.2 and 45 C. Values of Michaelis constant are equal for both species and constitute 0.031% to 0.034%. The rate of starch enzymolysis is higher for the tent caterpillar than for the gypsy moth - 2.13 mg and 1.63 mg of maltose, respectively, within 30 minutes in 1.5 ml of incubation mixture. A possible relationship between the values of parameters obtained and ecological factors is discussed.
ECentral; BIOCHEMISTRY, ENZYMES

399 Izhevskiy, S.S. 1974.
Adaptive patterns of digestive systems of the gypsy moth and the tent caterpillar. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Moscow: 171-180.
-- Adaptive capabilities of the digestive system of phytophagous insects are studied using the tent caterpillar and the gypsy moth. Lipases, amylases, alfa-glucosidase, beta-galoctosidase, beta-fructofuranosidase trehalase, pepsin- and trypsin-like peptidases have been found in the

intestinal tissues of these species. Shifts in enzyme activity in the course of ontogeny observed are ways that adjustments are made by different species and within a species to new feeding conditions to changes in environmental conditions. Labile chemical composition of food plants does not cause dysfunction of the organism as the intestine medium serves as a buffer providing uniformity of monomers involved in metabolic processes.
ECentral; BIOCHEMISTRY, ENZYMES

400 Kalinnikova, T.N. 1932.
Quantitative inventory of the fauna of decidous trees in the Crimea mountains. In: Trudy Leningradskogo obshchestva estestvoispytateley. Leningrad: 15-19.
EWest; FAUNAL LIST, HOST PLANTS

401 Kal'vish, T.K., Sekpit-Ool, T.M. 1974.
Interactions of muscardine fungi with gypsy moth microflora and epiphytic fungi of its food plants. In: Trudy Biologicheskogo instituta SO AN SSSR. Nauka, Novosibirsk: 8-17.
-- The interaction of muscardine fungi with microflora of healthy gypsy moth larvae and epiphytic microflora of pest food plants was recorded. Antagonistic activity of agents of mycoses in insect habitats is discussed.
WSiberia; FOLIAGE QUALITY, FUNGI

402 Kamber, A. 1914.
Control of the garden pest with gypsin. Sadovodstvo. (9):715-717.
-- Directions for producing and applying the insecticide gypsin are given. Application experiments on phyllophagous orchard pests, including gypsy moth in Kursk Province are described.
ECentral; CHEMICAL INSECTICIDES

403 Kamenek, L.K., Kharina, N.I. 1982.
Cytologic effect of delta-endotoxin *Bacillus thuringiensis* var. *galleriae* on the cell culture of *Lymantria dispar* L. In: Ispol'zovaniye mikroorganizmov v sel'skom khozyaystve i promyshlennosti. Nauka, Novosibirsk: 72-79.
-- Gypsy moth cells that were in contact with delta-endotoxin solution were studied in vitro by light scanning and transmission microscopy. Cell ultrastructure and appearance were found to undergo considerable changes compared to the control.
BACTERIA, CELL CULTURE, HISTOLOGY

404 Kamenek, L.K., Shternshis, M.V. 1984.
Effect of *Bacillus thuringiensis* delta-endotoxin on active ion transport in insects. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. (3):17-113.
WSiberia; BACTERIA, BIOCHEMISTRY

405 Kamyshny, N.S. 1925.
Forest pests and their control in Kharkov Province in 1924. Zakhyst roslin. (1-2):14-15.
-- The gypsy moth was not widespread, but was observed in nearly all the forests surveyed. Population increase is mentioned and the possibility of an outbreak is suggested.
EWest; GENERAL BIOLOGY, PEST LIST

406 Karasev, V.S. 1969.
Important pests of willow trees and their control in the floodplain forests of the Ukraine. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Kiev. 37 p.
-- The gypsy moth is one of the most important phyllophagous pests of willow stands in the floodplain. Pest foci are found in plots that have been flooded for a long time or have been weakened by excessive cattle grazing. Data on gypsy moth biology are given. In willow stands the gypsy moth often starves due to the presence of another serious pest, the willow moth. Pupation of gypsy moth larvae occurs often in willow moth nests, which provide protection for them. The levels of infestation of willow by the willow moth and the gypsy moth are inversely related.
EWest; ECOLOGY, HOST PLANTS, PEST LIST, STAND CONDITION

407 Karasev, V.S. 1971.
Impact of summer high-floods on the abundance of willow moth and gypsy moth in the Dniester River floodplains. In: Zashchita lesa ot vrednykh nasekomykh i bolezney. Vsesoyuznaya nauchno-tekhnicheskaya konferentsiya. Doklady. Moscow: 51-54.
-- Outbreaks of the gypsy moth and willow moth often occur in forest floodplains of the Dniester River. Gypsy moth reservations are black poplar stands, but in willow stands the two species compete. When willow moth populations are high there are no gypsy moth present. This is determined by different ecological requirements for the species: the willow moth cannot tolerate long periods of flooding while the gypsy moth is more tolerant of it.
EWest; HOST PLANTS, STAND CONDITION

408 Karasev, V.S., Satarova, T.I. 1973.
Impact of tannins from willow, poplar, and oak trees on gypsy moth development. Zakhyst roslin. 17:44-46.
-- Gypsy moth larvae taken from apple trees were fed oak, poplar, and willow. Larvae were fed leaves on branches. Each day the amount of food consumed was estimated and larvae were weighed. Tannin content was estimated in the food. With an increase in tannin content, the coefficient of food utilization became smaller and viability of the larvae declined. Tannins are regarded as impairing larval food utilization and causing mortality, particularly in early instars.
EWest; ENERGETICS, FOLIAGE CHEMISTRY, HOST PLANTS, NUTRITION

409 Karavaeva, R.P., Romanenko, K.Ye 1958.
Folivorous forest pests of the Northern Kirgizia. In: Trudy Kirgizskogoy lesnoy opytnoy stantsii. Frunze: 117-132.
-- A complex of forest pests was studied in Chuya Valley, Issyk-Kul Kettle, and Tyan-Shan Province from 1953-1957. One hundred and fifty six forest pest species were found; 50 of them are lepidopterans. The gypsy moth is regarded as a serious pest and is widespread in southern Kirgizia where it attacks mainly fruit and forest species. Egg masses are sometimes heavily attacked by

dermestids.
MAsia; PEST LIST

410 Kardidina, M.V., Fedoryak, V.Ye., Kharlamova, N.V., Simonova, T.I. 1982.
Gypsy moth and its control in northern Kazakhstan. In: Sbornik nauchnykh trudov Kazakhskogo NII lesnogo khozyaystva i agrolesomelioratsii. Shchuchinsk: 121-130.
-- A conclusion is made that collapse of gypsy moth foci in Kokchetav Province was due to the effect of biopreparations (bacterial and viral), insecticides that were used for treatment of foci, and entomophages, which killed the gypsy moth at every life stage. Biopreparations are particularly effective under favorable weather conditions and against early instars.
MAsia; BACTERIA, MICROBIAL PESTICIDES, VIRUS

411 Karpov, A.Ye 1987.
Reproduction of foreign baculovirus in the tissues of *Leptinotarsa decemlineata* Say (Coleoptera: Chrysomellidae). Mikrobiologicheskiy zhurnal. (2):78-81.
EWest; PHYSIOLOGY, VIRUS

412 Karpov, A.Ye., Karabash, Yu.A., Zolotarenko, A.I. 1977.
Detection of nuclear polyhedrosis latent virus carriers in natural populations of the gypsy moth *Lymantria dispar* L. (Lepidoptera, Lymantriidae).
Mikrobiologicheskiy zhurnal. 39(1):61-64.
-- By heating instars III-IV of a Kiev population up to 45 C for 60-120 minutes and delaying hibernation of eggs of an Azerbaijan population by 30 days, nuclear polyhedrosis virus was induced in the majority of insects, or the insects were identified as virus carriers. The results obtained suggest that there are a great many virus carriers among larvae of some gypsy moth populations. Effective chemical inducers of low toxicity should be found, which activate a latent nuclear polyhedrosis virus to protect plants from the pest without using toxic insecticides.
EWest, MAsia; TEMPERATURE, VIRUS

413 Kashkarova, L.F. 1981.
Nosematosis of the silkwork. Zashchita rasteniy. 9:28-29.
MAsia; MICROSPORIDIA

414 Kataev, O.A. 1981.
Some aspects of the impact of human activity on forest pests. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnius: 69-73.
-- Gypsy moth larvae were reared on larch needles collected in zones intensely polluted by aluminum and cellulose plants. The effect on ecological and physiological parameters of the gypsy moth was negative. In the vicinity of the aluminum plant, the content of magnesium in larch needles decreased to 69%, the content of manganese did not change, the content of copper increased to 143%, the content of iron, silicum, calcium, and aluminum increased to 167, 175, 224 and 368%, respectively.
ECentral; AIR POLLUTION, FOLIAGE CHEMISTRY

415 Katerinich, A.A. 1930.
Materials on lepidopterous fauna in the Ukraine. In: Trudy Kharkivskogo tovaristva doslidnikiv prirody. Kharkov: 65-74.
-- A list of 233 lepidopterous species is given. The gypsy moth is mentioned as a species limited in number.
EWest; FAUNAL LIST

416 Kellus, O.G. 1939.
The role of food plants in gypsy moth development. Zoologicheskiy zhurnal. 18(6):1010-1020.
-- Data are given on larval and pupal survival, dates and duration of life stages, larval and pupal weight, sex ratio, and imago fecundity, in connection with the food plants of the larvae. The gypsy moth can feed on more than 275 plant species, but it develops normally and produces offspring only on a limited variety of plants.
ECentral; HOST PLANTS, NUMERICAL DATA

417 Kellus, O.G. 1941.
Geographic occurrence of the gypsy moth and its outbreak areas in the USSR. Vestnik zashchity rasteniy. (1):45-50.
DISTRIBUTION

418 Keppen, F.P. 1883.
***Ocneria (Liparis) dispar* L.** In: Vrednyye nasekomyye. Spetsial'naya chast' 2. Babochki, dvukrylye i poluzhetskokrylyye. St. Petersburg: 49-59.
-- Gypsy moth appearance and location are described. Nearly all hardwood and conifer species of trees and shrubs as well as herbs are food plants. Aspects of ecology, and outbreak control by pathogens and entomophages are discussed. Chronology of outbreaks in the European part of Russia is traced from 1842.
ECentral; DISTRIBUTION, ECOLOGY, HOST PLANTS, OUTBREAKS

419 Keremedchiev, M.T. 1968.
Gradation dynamics of the gypsy moth (*Lymantria dispar* L.) in the People's Republik of Bulgaria. In: XIII Mezhdunarodnyy entomologicheskiy kongress. Tom 3. Moscow: 51-54.
-- The author presents data on gypsy moth outbreaks in Bulgaria during the period 1891 to 1965. From 1891 to 1932 every gradation lasted 3 years, with depression periods of 5 to 11 years. The length of the gradations increased to 4 to 5 years, with 2 to 3 year depressions during the period from 1932 to 1946. A 12-year gradation broke out in 1946. During the period from 1949 to 1965 two widespread gradations broke out. The first gradation collapsed by 1952, the second broke out in 1962 and lasted until 1968. Fluctuations of gypsy moth populations resulted from a number of factors: climatic conditions, stand condition, quality and quantity of food, and presence of entomophages and diseases. In the period between outbreaks, both fecundity and survival declined. The highest survival and fecundity was observed in the prodromic period.
EWest; FOLIAGE QUALITY, POPULATION FLUCTUATION, WEATHER

420 Khakimov, A. 1972.

The tachinid fauna (Diptera, Tachinidae) of the Tashkent region. Entomologicheskoye obozrenie. 51(2):296-303.
-- The parasites *Exorista rossica* Mesnil and *Ceromasia rubrifrons* Macquart were reared from gypsy moth larvae. This is the first time the latter species was recorded as a parasite of the gypsy moth. It was also reared from larvae of the large cabbage butterfly. Geographic range and habitat is given for 105 species of tachinids. [English translation of this article is in Entomological Review 51:180-184.]
MAsia; PARASITES

421 Khalilov, Sh. Kh 1976.
Phosphororganic preparations against the gypsy moth. Zashchita rasteniy. (5):43.
-- Phtalaphos, phosalon, and BI-58 were used against the gypsy moth in pistachio stands of southern Kirgizia during the pest outbreaks in 1972-1973. Their efficiency was recorded.
CAsia; CHEMICAL INSECTICIDES

422 Khamdam-Zade, T.K. 1968.
The gypsy moth (*Porthetria dispar* L.) in the foothills of Fergana Valley. In: Materialy 3 nauchnoy konferentsii po sel'skomu khozyaystvu. Fan, Tashkent: 165-168.
-- General data on pest ecology are given. Gypsy moth heavily attacks apricot orchards. Only pesticide treatments are suggested as control measures. Some effective pesticides caused 100% larval mortality. Treatments were made twice: during egg hatch and in instars III and IV.
CAsia; CONTROL, HOST PLANTS

423 Khamdam-Zade, T.K. 1972.
Gypsy moth and its control in peach gardens in the northeast of Central Asia. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Tashkent. 24 p.
-- The author studied gypsy moth geographical distribution in the Fergana Valley and Chirk-Angeren oasis. Species biology, ecology, and damage in Central Asia, and the development of control measures also were studied. It was discovered that the population in question is morphologically different from other forms of the gypsy moth. The author distinguished it as *Ocneria dispar* (forma) ferganica. The gypsy moth is found at the foothills and in mountainous regions at elevations no less than 1,000 m above sea level. Oviposition usually occurs on apricot and rarely on apple, and if these species are unavailable, oviposition occurs on other trees, primarily in the butt zone, but seldom higher. The maximum height of oviposition is 8 to 10 m. The most favored food plant is apricot followed by apple. Gypsy moth control measures in the orchards are suggested, including agrotechnical, chemical-mechanical, and chemical methods. Very good results were achieved by applying bacterial preparations.
MAsia; GEOGRAPHIC VARIATION, HOST PLANTS, OVIPOSITION SITE

424 Khanislamov, M.G. 1958.
Gypsy moth population dynamics relative to feeding conditions and weather. In: I-ya mezhvuzovskaya konferentsiya po zashchite lesa. Tezisy dokladov. Moscow: 108-110.
-- In the 1950's gypsy moth outbreaks were recorded in central and southern regions of the European part of the USSR, West Siberia, USA, and Western Europe. It is believed that the onset of pest outbreaks correlates to the years of declining or minimum solar activity, which cause changes in the meteorological conditions in pest habitats (i.e., the low hydrothermal coefficients of May and June and severe winters). The longer the phase of pest population depression, the smaller the change of meteorological conditions, which are favorable for pest outbreak development. Repeated combinations of favorable conditions are not necessary for a continuous increase in number, but they can cause outbreak prolongation. Effect of favorable conditions on gypsy moth population is seen only in fecundity variation and insect survival. Embryonal mortality plays an important part in general population dynamics. To estimate egg viability and to establish possible causes of egg and embryonal mortality, a method of luminescing egg contents with UV-rays is suggested; unfertilized eggs, live and killed embryos, and parasitized eggs differ in luminosity.
EWest, EEast, WSiberia; EGGS, FECUNDITY, POPULATION DYNAMICS, SOLAR ACTIVITY, WEATHER

425 Khanislamov, M.G. 1963.
Driving conditions of an outbreak initiated by folivorous insects. In: Voprosy lesozashchity. Moskva: 34-35.
-- Outbreaks of phytophage complex, including the gypsy moth, correlate to the years of solar activity decline, because the meteorological situation becomes favorable for pests. Low hydrothermal coefficients in May and June and severe winters contribute to higher survival of phytophages and improvement of food quality.
EEast; OUTBREAKS, SOLAR ACTIVITY, WEATHER

426 Khanislamov, M.G., Girfanova, L.N., Yafaeva, Z.Sh., Stepanova, R.K. 1958.
Gypsy moth outbreaks in Bashkiria. In: Issledovaniye ochagov vrediteley lesa Bashkirii. Ufa: 5-45.
-- Gypsy moth outbreaks are recorded in Bashkiria every 8 to 14 years. Primary foci originate in light hardwood stands of the forest-steppe zone of the republic. They serve as a source of secondary and tertiary pest foci. Outbreak, as a rule, starts in two years after drought in May and June and a severe winter. In primary foci, an outbreak lasts 6 to 7 years, with 2 years of population increase, 2 to 3 years of the eruption phase, and 2 years of population decrease. In secondary and tertiary foci gradation is displaced in phase by 3 to 4 years. Outbreak collapse is caused primarily by biotic factors. In the foci, entomophages kill more than 80% and sometimes 96%, of the pest population. Forty-nine primary and secondary entomophages of the gypsy moth are recorded in Bashkiria. In Bashkiria survival stations are aspen, birch, and oak-birch light forests. For oviposition females prefer birch. The maximum larval weight is recorded on poplar.
EEast; OVIPOSITION SITE, PARASITES, POPULATION DYNAMICS, STAND COMPOSITION, WEATHER

427 Khanislamov, M.G., Girfanova, L.N., Yafaeva, Z.Sh., Stepanova, R.K. 1962.
Conditions for establishing foci and gypsy moth population increase in Bashkiria. In: Issledovaniye ochagov vrediteley lesa Bashkirii. Ufa: 32-66.
-- At the depression phase, the gypsy moth population usually occupies foci with unstable boundaries. Origination and migration of foci are related to selective feeding of larvae and selective oviposition of adults. Population increase from the depression phase is not associated with higher fecundity, but is determined by higher total survival caused by a certain combination of weather conditions: drought in May and June and a very severe winter of the preceding or following year. Gypsy moth gradation develops more rapidly in the stands where pest population density at the prodromic phase is higher due to availability of reservations or collapsing foci. Intensity of outbreak development also depends on availability of entomophages, which vary in their composition and effectiveness in different areas and gradation phases. Continuous gypsy moth control is achieved only by diseases and special entomophages. Pest potential is higher when the gypsy moth feeds on weakened trees and its sensitivity to changing feeding conditions depends on the gradation phase. In pest foci, 55 entomophagous species are found: 33 Hymenoptera, 14 Diptera, 6 Coleoptera, 1 Hemiptera and 1 nematode. *Angitia chrysisticta* Gmel., *Gelis pulicaria* Rorst., *Microgaster tibialis* Nees, *Anilasta tricincta* Holmgr., *Meteorus pulchricornis* Wesm., and *M. versicolor* Wesm. are recorded for the first time in Bashkiria.
EEast; FECUNDITY, NEMATODES, PARASITES, POPULATION DYNAMICS, PREDATORS, WEATHER

428 Khanislamov, M.G., Vekshina, R.S. 1962.
Correlation between gypsy moth outbreak collapse and physiological state of a tree. In: Nauchnaya konferentsiya po voprosam massovykh razmnozheniy vrediteley lesa. Ufa: 97-102.
-- Factors causing numerical decrease of gypsy moth populations in the foci were studied. It is believed that the main factor causing population decrease is changes in leaf quality after one or two defoliations. The conclusion is based on the results of experiments rearing gypsy moth larvae on oak and subjecting them to artificial defoliation.
EEast; DEFOLIATION, FOLIAGE QUALITY, REARING

429 Khanislamov, M.G., Yafaeva, Z.Sh. 1964.
Biological regulation of pest abundance at various phases of its gradation cycle. In: Issledovaniye po biologicheskomu metodu bor'by s vreditelyami sel'skogo i lesnogo khozyaystva. Novosibirsk: 204-206.
-- From 1952 to 1963 stationary surveys of the level of gypsy moth micro- and macroparasitism were conducted in two foci in Bashkiria. In 1952, both foci were at the eruption phase. In 1962, an increase in number started in one of them; in the other, the second cycle of numerical fluctuations had ended. The level of parasitism was estimated by the population-analytical method. Larvae were sampled from both foci twice within a generation (during the period of development of instars II and III, and during pupation), egg masses were collected after parasites emerged. The role of entomophages in pest control was determined by focus condition and the host gradation phase. Species composition and efficiency index of entomophages (percentage of parasitism) changed every year. At the beginning of a depression, 97% to 98% of the insects died of diseases; as a result, the population was sanitized and survival increased greatly. In that period, the contribution of special entomophages was higher. Polyhedrosis viruses and the entomophages *Apanteles disparis* and *Phorocera silvestris* were always found in the foci. The role of polyphagous parasites increased during the period of host population increase and during the eruption phase (65-90%) of parasitized insects.
EEast; PARASITES, POPULATION DYNAMICS, VIRUS

430 Kharitonchenko, R.P. 1976.
Patterns of gypsy moth feeding and development on introduced woody species. In: Issledovaniye komponentov lesnykh biogeotsenozov Sibiri. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 25-29.
-- Gypsy moth larvae were reared in the laboratory on 11 species of aboriginal and introduced plants. Common birch, goat willow, and aspen proved to be the most favorable species; average fecundity was 112, 163 and 152, respectively on these species. The multiplication index (37.7 to 53.6), and mean weight of females (727 to 1044 mg) also were recorded. Females prevailed in the population. On some introduced tree species the mean weight of females was very high, yet males prevailed in the population, and the general level of reproduction was lower. The most evident sign is larval survivorship. Introduced food plants did not, as a rule, provide normal development of the gypsy moth. It is concluded that unfavorable tree species such as white poplar, mountain elm, and others could be introduced into stands.
WSiberia; FECUNDITY, HOST PLANTS, REARING, SILVICULTURAL TREATMENTS

431 Kharitonov, L.I. 1941.
Gypsy moth and measures for its control. (Neparnyy shelkopryad i mery bor'by s nim.) OGIZ, Gorki. 42 p.
CONTROL

432 Khar'kov, V.I. 1980.
Distribution pattern of gypsy moth egg masses in connection with ecological factors within the Saratov-Astrakhan shelter belt in the arid steppe of Saratov Zavolzhye. In: Zashchita rasteniy ot vrediteley i bolezney na Yugo-Vostoke i v Zapadnom Kazakhstane. Saratov: 51-55.
-- The effect of species composition in shelter belts on gypsy moth oviposition was studied. It is suggested that shelter belts should be of a certain species composition in order to diminish defoliation by the gypsy moth. Species composition in pest foci is as follows: 40% English oak, 40% elm, 20% green ash, and undergrowth-golden currant. The favored food plant of the pest is oak. For oviposition, females prefer elm and ash.
ECentral; OVIPOSITION SITE, STAND COMPOSITION

433 Khitsova, L.N., Isaeva, G.A. 1986.
Entomophages of forest pests in Central

Chernozemye. (Entomofagi vrediteley lesa Tsentral'nogo Chernozem'ya.) Izd. Voronezhskogo gosudarstvennogo universiteta, Voronezh. 120 p.
-- The gypsy moth is mentioned among the most important forest pests of Voronezh Province. The species biology, ecology, and population dynamics is briefly described. The list of entomophages of forest pests includes 57 tachinid species, 61 ichneumonid species, and 56 braconid species. One hundred and fifty-four lepidopterous species, 17 sawflies, and 5 beetle species are listed as hosts of these entomophages. Trophic relations and ecology of tachinids as well as morphological peculiarities of their puparia are discussed. General data are given on hymenopterous parasites extracted from phyllophagous pests. The role of the parasite complex in pest control in the Voronezh Province is estimated.
ECentral; FAUNAL LIST, PARASITES

434 Kim, N.G. 1976.
Application of insecticides against folivorous pests in the walnut forests of Central Asia. In: Ispol'zovaniye chimicheskikh i biologicheskikh sredstv v bor'be s vreditelyami lesa. VNIILM, Moscow: 64.
-- The most important pests of nut forests are the gypsy moth, and fruit and apple moths. Benzophosphate, gardon, phosalon, antio and phthalophos were successfully used in gypsy moth control. Their technical efficacy was 89.9% to 98.4%.
CAsia; CHEMICAL INSECTICIDES

435 Kim, N.G., Khalilov, Sh. Kh, Dvozhon, V.A., Kim, Z.I. 1976.
Aerial chemical control of the gypsy moth in pistache-woodland. Lesnoye khozyaystvo. (10):76-77.
-- In Central Asia over 300,000 ha of pistachio woodlands are heavily attacked by many pests, most importantly the gypsy moth. The largest foci are found in south Kirgizia. From 1973-1975 these areas were treated with aerial applications of chemicals such as phosalon phthalophos and antio; mortality was 90%. On the tenth day after spraying, the residual level of pesticides was lower than the maximum permissible concentration. These preparations are effective when used for gypsy moth control in pistachio woodlands.
CAsia; AERIAL SPRAYING, CHEMICAL INSECTICIDES

436 Kipiani, A.A., Machavariani, E.A. 1977.
Genetic control of the gypsy moth. In: Sbornik nauchnykh rabot po izucheniyu bol'shogo elovogo luboeda v Gruzii. Institut gornogo lesovodstva, Tbilisi: 161-171.
Caucasus; GENETICS

438 Kipiani, A.A., Machavariani, E.A. 1979.
Prospects for the combined use of chemical sterilants and insect pheromones under field conditions in the Georgian USSR. In: Biologicheskiye veshchestva v zashchite rasteniy. Kolos, Moscow: 6-84.
Caucasus; CHEMICAL INSECTICIDES, MORPHOLOGY, PHEROMONES

437 Kipiani, A.A., Machavariani, E.A., Chapidze, N.F. 1980.
Preliminary results of studying the combined use of sterilization traps and pheromones in the East Georgian forests. In: Zashchita lesov ot vrediteley i bolezney. Moscow: 143-150.
Caucasus; CONTROL, MORPHOLOGY, PHEROMONES

439 Kireeva, I.M. 1976.
Estimating the state of the gypsy moth population using morphological and physiological features of larvae. In: Ob okhrane nasekomykh. Erevan: 62-64.
-- Numerical fluctuations in the gypsy moth population in the Lower Dnieper region resulted from a strong correlation between species condition and environmental conditions. Not only does the population size fluctuate, but the morphological and physiological condition of the insects changes. Morphological and physiological polymorphism has an adaptive nature; it increases species plasticity and is a necessary condition for the regulation of population dynamics.
EWest; MORPHOLOGY, PHYSIOLOGY, POPULATION FLUCTUATION

440 Kireeva, I.M. 1978.
The role of population density to the dynamics of gypsy moth number in the Lower Dnieper region of the USSR. Vestnik zoologii. (2):31-34.
-- Major food species in the region are oak and bastard acacia. Changes in gypsy moth population density are reflected in morphological peculiarities of larvae. When reared singly, larvae are, for the most part, light in color. Survival of a single larva is higher than those found at high densities. Population density affects growth rate of larvae. As a response to overpopulation, larval weight decreases. Sex index is also related to population density.
EWest; DENSITY, COLOR POLYMORPHISM

441 Kireeva, I.M. 1978.
Prediction of gypsy moth outbreaks. Lesnoye khozyaystvo. (4):86-87.
-- Morphological differences among gypsy moth larvae from the foci at different gradation stages are studied.
EWest; MORPHOLOGY, POPULATION DYNAMICS

442 Kireeva, I.M. 1979.
Morphological and physiological structure of the gypsy moth population in the Lower Dnieper region. Lesovedenie. (6):12-19.
-- Investigations of the gypsy moth carried out from 1971-1975 showed that the physiological and biochemical changes that occur in the process of insect development are of great importance for population dynamics.
EWest; DEVELOPMENT, PHYSIOLOGY, POPULATION DYNAMICS

443 Kireeva, I.M. 1980.
Ecological and physiological characteristic of the gypsy moth population in the Zakarapatje region. In: Issledovaniya po entomologii i akarologii na Ukraine. Tezisy dokladov 2-go s"yezda UEO, Uzhgorod 1980. Kiev: 100-101.
-- From 1977-1978 the gypsy moth was studied in two foci; one with a population increase and one in collapse.

In the outbreak focus, 81% of the larvae were grey and 18% were red, in the depression focus they comprised 63% and 37%, respectively. Sex index in the focus with an increase in population was 0.46%, and 0.29% in the collapsing focus. In the collapsing focus, larval development lasted longer, survival, pupal weight, and lipid content were lower, and there were fewer and smaller egg masses.
EWest; COLOR POLYMORPHISM, POPULATION DYNAMICS

444 Kireeva, I.M. 1981.
Intrapopulation aspects of gypsy moth population dynamics. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnius: 83-84.
-- During the course of gypsy moth gradation, its population is continuously restructured through changes in larval morphotypes and physiological parameters. High intensity of metabolic processes determined by increase in oxygen uptake is accompanied by decrease in larval and pupal weights.
EWest; MORPHOLOGY, PHYSIOLOGY, POPULATION DYNAMICS

445 Kireeva, I.M. 1983.
Ecology and physiology of the gypsy moth. (Ecologiya i fisiologiya neparnogo shelkopryada.) Naukova Dumka, Kiev. 128 p.
-- This is a major work that discusses the ecology and physiology of the gypsy moth in various landscape and geographical conditions. Five larval morphotypes are distinguished and physiological peculiarities of each morphotype are studied. Recommendations are given for forecasting gypsy moth population dynamics and for monitoring the pest in its foci. A long list of reviewed literature is included.
EWest, Caucasus; COLOR POLYMORPHISM, MONITORING, PHYSIOLOGY, POPULATION DYNAMICS, PROGNOSIS, REVIEW

446 Kireeva, I.M. 1985.
Phenetic approach to studying the intraspecific variability in the gypsy moth. In: Sistema monitoringa v zashchite lesa. Tezisy dokladov Vsesoyuznogo soveshchaniya. Institut lesa i drevesiny SO AS SSSR, Krasnoyarsk: 46-47.
-- Frequency of occurrence and some physiological parameters of larvae of various coloration morphotypes were studied in gypsy moth populations from the Lower Dnieper region, the Carpathian region, and Armenia. The following larval morphotypes were taken: grey and red chitin coloration, three dorsal stripes, velvety black dorsal stripe, bright spots on the back, and a marble-like pattern of hypodermis. A conclusion is made for a correlation between gypsy moth population fluctuations and frequency of different morphotypes.
EWest, Caucasus; COLOR POLYMORPHISM, PHYSIOLOGY, POPULATION FLUCTUATION

447 Kireeva, I.M. 1986.
Phenetic methods of investigating *Lymantria dispar* L. Lesnoye khozyaystvo. (11):50-52.
-- Larval morphotypes were studied in the Lower Dnieper region. The following phenes were distinguished: grey, red, and one type with a velvety-black stripe. Phenetic diversity is determined by natural conditions. The author suggests that biochemical and physiological peculiarities of food plants should determine larval morphotypes. There are no red larvae in the willow micropopulation, they are abundant on oak, and a few can be found on acacia. The proportion of different morphotypes changes with changing food plants. Larvae of different morphotypes store energy differently. A red phene has the highest survival during the larval stage, and adult fecundity is also higher. A grey phene indicates a longer life and higher survival at the egg stage. Insects belonging to the grey phene, which are abundant in nature, are not resistant to chlorophos. Mortality amounts to 100%, yet mortality of red phene insects is 80% to 85%. When an outbreak is at its peak, grey larvae prevail. It is advisable to carry out control measures when red phene insects comprise the population.
EWest; COLOR POLYMORPHISM, HOST PLANTS, POPULATION QUALITY

448 Kireeva, I.M. 1987.
Phenetic approach to studying intraspecific variability in gypsy moth. (Feneticheskiy podkhod k izucheniyu vnutrividovoy izmenchivosti neparnogo shelkopryada.) Vestnik zoologii, Kiev. 12 p. (Deposited Document. VINITI 8742-V87)
-- Different phenes of the gypsy moth are distinguished on the basis of chitin and hypodermis coloration. Differences in the frequency of occurrence of certain phenes in pest populations from the lower Dnieper region, the Carpathian region, and Armenia are shown. Changes in the phene pool structure are different at different developmental stages of each of the populations under study. Phenes were found with frequencies that are persistently at high or low levels, have considerable fluctuations, and occur only at certain stages of population dynamics. This probably relates to their different functions in gypsy moth population.
EWest, Caucasus; COLOR POLYMORPHISM, POPULATION DYNAMICS

449 Kireeva, I.M. 1988.
Role of population density and structure in the gypsy moth density dynamics. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 12.
-- The effect of density was studied on gypsy moth larvae from different populations from the Lower Dnieper region, the Carpathian region, and Armenia that were reared on oak. With a density increase, the main color of the body was observed to change from light yellow to dark grey. Density dependent change in larval coloration also caused changes in survival, growth rate, larval and pupal weight, and sex index. Thus, morphological and physiological changes of the gypsy moth are related to the functioning of regulatory mechanisms causing numerical changes in certain gypsy moth populations.
EWest, Caucasus; COLOR POLYMORPHISM, DENSITY, PHYSIOLOGY, REARING

450 Kireeva, I.M., Kolybin, V.A. 1974.

Morphological and physiological polymorphism in the gypsy moth larval population from the Lower Dnieper region. In: Materialy VII s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Leningrad: 218-219.
-- Intrapopulation variation of ecological and physiological parameters of gypsy moth populations from the lower Dnieper region was studied. In addition to ecological and physiological differences among trophic micropopulations distinguished in the Lower Dnieper population, larval polymorphism was observed within every micropopulation. Five larval types are differentiated by the color of hairs, dorsal warts, shade of hypodermis, head marks, and the extent at which dorsal stripes are seen. Morphological and physiological polymorphism of larvae in the gypsy moth population provides wide adaptability and increases general survival, which makes it an important factor in regulating the pest population.
EWest; COLOR POLYMORPHISM, PHYSIOLOGY

451 Kobakhidze, D.N. 1957.
Gypsy moth. In: Vrednaya entomofauna sel'skokhozyaystvennykh kul'tur Gruzinskoy SSR. Izd.An Gruz. SSR, Tbilisi: 228-229.
-- Data on the damage caused by the gypsy moth in Georgia, including pest phenology and ecology, are presented.
Caucasus; GENERAL BIOLOGY

452 Koblova, F.V. 1921.
Report on activity of the Orlov plant protection station in 1920-1921. In: Byulleten' III Vsesoyuznogo entomo-fitopatologicheskogo s"yezda v Petrograde 18-25 dekabrya 1921 goda. Petrograd: 17-24.
-- The gypsy moth is mentioned among forest pests, but at that time its numbers were limited.
ECentral; PEST LIST

453 Kobzar', V.F. 1987.
Technology and effectiveness of aerial spraying with bacterial suspensions against phytophages in the forest shelterbelts. In: Sbornik nauchnykh trudov VNII agrolesomelioratsii. Zashchita agromeliorativnykh nasazhdeniy i stepnykh lesov ot vrediteley i bolezney. Volgograd: 42-46.
-- A technique of aerial spraying shelterbelts in the southeastern USSR with bacterial suspensions against major oak pests, such as the green oakleaf roller and the gypsy moth, are described.
EEast; AERIAL SPRAYING, BACTERIA, MICROBIAL PESTICIDES

454 Kobzar', V.F., Volkogonov, S.D., Timchenko, G.N., Dorogoichenko, N.I., Levina, V.V. 1981.
Application of biological preparations against gypsy moth. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 96-97.
-- In 1979 and 1980, gypsy moth foci in oak groves of the Odessa Province were sprayed from the air with dendrobacillin containing an adherent and bitoxibacillin (their titers were 30 billion) at the rate of 2 kg/ha and with virin-ENSh (containing 1 billion polyhedra per 1 ml). Technical chlorophos (80%) at a rate of 1.0 kg/ha was used as the reference. Treatments were made when trees were completely leafed, defoliation was 20% to 30%, and the majority of larvae were in the third instar. Technical efficacy of biopreparations was 95.7% to 99.8%, compared to 93.9% efficacy of chlorophos.
EWest; AERIAL SPRAYING, BACTERIA, MICROBIAL PESTICIDES, PHENOLOGY, VIRUS

455 Kokhmanyuk, F.S. 1964.
Egg laying by *Ocneria dispar* L. Zoologicheskiy zhurnal. 43(2):290-291.
-- Females start ovipositing within an hour after copulation. The highest oviposition activity is during the first day, from 2 p.m. to 6 p.m., and on the third or fourth day after oviposition. The duration of oviposition is determined by potential fecundity, which correlates to female size. Large females oviposit for 6 to 10 days, and small ones for 2 to 3 days; the full stock of eggs range from 130 to 1000. Medium-sized females with an egg stock of 400 to 600 eggs prevail in the Polesye population. Larger females comprise about 5% of the population, and smaller ones comprise 10%. In Byelorussian Polesye, location of egg masses along the tree trunk seems to correlate to their sizes; i.e., large egg masses are on the lower part of the trunk, and smaller ones are on the upper part.
EWest; FECUNDITY, OVIPOSITION BEHAVIOR, OVIPOSITION SITE

456 Kokhmanyuk, F.S. 1964.
Location of gypsy moth *Ocneria dispar* L. egg masses depending on the environment. Nauchnyye doklady vysshey shkoly, biologicheskiye nauki. (1):24-26.
-- In Brest Province every female deposits 2 to 3 eggs masses. This conclusion is based on the fact that the average number of eggs in egg masses collected in nature is 200 to 300, and the average number of eggs deposited by a female in the laboratory is 400 to 600. In this population, oviposition occurs primarily in the butt zone, and fluctuations in height are determined by weather conditions in the oviposition period and by the conditions of a specific biotope. In rainy years, egg masses tend to be deposited higher than in dry years, and in orchards they are deposited higher than in forests. In the forest, egg masses are found primarily at forest edges in dry years, and they are more or less evenly distributed over the forest in rainy years. For oviposition females prefer old trees with rough bark, and there are 5 to 60 times more egg masses on old trees than on young ones. Females (over 80%) appear to prefer southeastern aspects of trees for oviposition.
EWest; FECUNDITY, OVIPOSITION SITE

457 Kokhmanyuk, F.S. 1967.
Outbreak cyclicity and dynamics in the gypsy moth (*Ocneria dispar* L.) in Brest region. Nauchnyye doklady vysshey shkoly, biologicheskiye nauki. (12):35-38.
-- The leading factors determining the cyclic character of gypsy moth gradation and regularities of its population dynamics are solar activity, accumulation of pathogens in the focus, and heterosis. Solar activity, ultraviolet, X-ray

and corpuscular radiation affect the pest's survival directly or indirectly, through natural enemies and diseases. Some groups of insects showed increased survival under unfavorable environmental conditions due to inheritance. Infectious diseases that spread in the focus are accumulated and later control and suppress pest development in the given area for 5 to 6 years after an outbreak.
EWest; GENETICS, POPULATION DYNAMICS, SOLAR ACTIVITY

458 Kokhmanyuk, F.S. 1969.
The role of chemoreception in the gypsy moth. In: I-ya Vsesoyuznaya konferentsiya po strukture i funktsii obonyatel'nogo analizatora zhivotnykh i cheloveka i ikh modelirovaniyu. Tezisy i referaty dokladov. MGU, Moscow: 57-58.
-- Chemoreception is the main factor in mating behavior and fertilization of the gypsy moth.
EWest; MATING, PHEROMONES

459 Kokhmanyuk, F.S. 1972.
Population dynamics of the gypsy moth (*Ocneria dispar* L.) and its determining factors in Belorussian Polesye. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Minsk. 27 p.
-- Gypsy moth ecology in Belorussian Polesye was studied, in addition to the role of abiotic, biotic and genetic factors in gypsy moth population dynamics. The effectiveness of the application of light traps and attractants for studying pest ecology and for preventive control of this species was tested.
EWest; ECOLOGY, GENETICS, LIGHT TRAPS, PHEROMONES, POPULATION DYNAMICS

460 Kokhmanyuk, F.S. 1975.
Migrations of the gypsy moth larvae and adults (*Ocneria dispar* L.). In: Povedeniye nasekomykh kak osnova dlya razrabotki mer bor'by s vreditelyami sel'skogo i lesnogo khozyaystva. Naukova Dumka, Kiev: 73-75.
-- Newly hatched larvae migrate passively by wind and actively when there is inadequate food or overcrowding. Migrating first instars leave a trail of silk along which other larvae follow. The width of the silk trail is a sign of the density of the larvae. Usually, the instinct of migration is retained for 1-3 days and larvae can starve for 5-10 days. If the weather is hot, the larvae can creep a distance of 1-3 km maintaining a straight line. The distance at which larvae can be dispersed by wind is proportional to the product of the square of the wind force and the waftability coefficient. Adults migrate when males search for mates and females fly to light. In experiments with marked male moths, females were discovered 1.8 km away after 1.5 hr. Male flight speed is given as 6 km/hr.
EWest; DISPERSAL, FEMALES, FLIGHT, LARVAE, MALES

461 Kokhmanyuk, F.S. 1976.
Factors of gypsy moth population dynamics in the Polesye region. In: Sovremennyye problemy zoologii i sovershenstvovaniya metodiki eye prepodavaniya v VUZe i shkole. Perm: 83-85.
-- Analysis of gypsy moth dynamics in Belorussian Polesye from 1919 to 1974 shows that the given species supports the concept of random environmental effect. This effect causes fluctuation, which is stabilized by biotic and genetic factors functionally correlated to density. Based on the evidence of a correlation made between cycles of gypsy moth gradation and an 11-year cycle of solar activity, positive effect of UV-radiation on pest larvae is recorded. The trophic factor can have a different effect on population dynamics, manifesting itself through food quantity and quality. The strongest correlation is between biotic and genetic factors, and population density. Outbreeding resulting in heterosis leads to a 1.5-3.0-fold decrease in mortality and a 15% to 35% increase in fecundity. As a rule, outbreaks occur in the foci where insects of different populations cross. By analyzing gypsy moth population density, one can see mass effect and group effect, manifested as an the increase in fecundity, development rate, and survival. But when the optimum density has been reached all parameters worsen. Density effect also depends on the gradation phase. For instance, if density is artificially increased 3x during the depression phase mortality was 54%, during the outbreak phase it was 29%. The author believes that metabolites released by larvae serve as a signal for the mechanisms regulating density to start functioning.
EWest; DENSITY, GENETICS, POPULATION FLUCTUATION, SOLAR ACTIVITY

462 Kokhmanyuk, F.S. 1978.
Role of polymorphism in gypsy moth (*Ocneria dispar* L.) population dynamics. In: Fiziologicheskaya i populyatsionnaya ekologiya zhivotnykh. Izdatel'stvo Saratovskogo universiteta, Saratov: 51-54.
-- Polymorphism in the coloration of gypsy moth larvae of the Polesye population is accounted for monoallelic inheritance with the superdomination phenomena in the heterozygous state. Dynamics of larvae belonging to different color types during the course of gradation is indicative of a balanced polymorphism and a different adaptive value of different genotypes and phenotypes. Of highest viability are heterozygotes with a dark hypodermis, followed by grey larvae, homozygous for a dominant gene, which usually prevail in the population. Light larvae (yellow), which are homozygous for a recessive gene, are the least viable.
EWest; COLOR POLYMORPHISM, GENETICS, POPULATION QUALITY

463 Kokhmanyuk, F.S. 1979.
Population dynamics and microevolution of gypsy moth. In: Novyye problemy zoologicheskoy nauki i ikh otrazheniye v vuzovskom prepodavanii. Tezisy dokladov nauchnoy konferentsii zoologov pedagogicheskikh institutov. Stavropol: 88-90.
-- A conclusion is made that during the period of depression there is no genetic drift in the foci. During the depression period, heterosis comes into play, contributing to random preservation of some genes in new conditions. Due to a cyclic nature of pest population dynamics, a new polygenic system, which gives rise to various new forms of isolation, emerges at the boundary of the population.
EWest; GENETICS, POPULATION DYNAMICS

464 Kokhmanyuk, F.S. 1980.
Gypsy moth attractants. Khimiya v sel'skom khozyaistve. 18(12):21-24.
-- Domestic and foreign literature are reviewed that discuss application of gypsy moth attractants for determining flight dynamics, population numbers, and male disorientation as a control measure.
PHEROMONES, REVIEW

465 Kokhmanyuk, F.S. 1981.
Role of behavior in the population dynamics of gypsy moth (*Ocneria dispar* L.) in Polesye area. In: Povedeniye nasekomykh kak osnova dlya razrabotki mer bor'by s vreditelyami sel'skogo i lesnogo khozyaystva. Minsk: 129-133.
-- Egg hatch usually coincides in time with leafing of food species. Larvae feeding on willow are the first to hatch, followed by larvae feeding on Rosaceae, with larvae feeding on oak the last to hatch. After staying on the "areolet," further larval behavior is determined by their density. At a high density, a high number of the larvae migrate actively and migration foci originate. In this period, larvae are divided into active and passive ones, according to their behavior. Certain behavioral differences are observed between groups of larvae that feed on different species or on one species, larvae that have developed at varying temperature conditions, and larvae that have hatched out of eggs differing in weight, etc. A conclusion is made that gypsy moth behavior in foci is one of the factors determining population dynamics; thus, its role and importance should be considered when predicting pest outbreaks.
EWest; BEHAVIOR, DISPERSAL, EGG MASSES, LARVAE, PHENOLOGY, POPULATION QUALITY,

466 Kolomiets, N.G. 1955.
Forest pests of Khakassia. In: Trudy Tomskogo gosudarstvennogo universiteta. Seriya biologii. : 34-39.
WSiberia; PEST LIST

467 Kolomiets, N.G. 1955.
Important forest pests of West Siberia and their control. In: Trudy Zapadno-sibirskogo filiala AN SSSR i Zapadno-sibirskogo otdeleniya VNITOLES. Novosibirsk: 1-35.
WSiberia; CONTROL, PEST LIST

468 Kolomiets, N.G. 1958.
Parasites of insect forest pests in Siberia. Entomologicheskoye obozrenie. 37(3):603-615.
WSiberia, ESiberia, Far East; PARASITES

469 Kolomiets, N.G. 1975.
Materials on fauna and biology of parasitic dipterans of Tachinidae subfamily (Diptera, Tachinidae). In: Trudy Biologo-pochvennogo instituta DNTs AN SSSR. DNTs AN SSSR, Vladivostok: 21-46.
WSiberia, ESiberia, Far East; PARASITES

470 Kolomiets, N.G. 1977.
Fauna and biology of parasitic dipterans of the subfamily Exoristinae (Diptera, Tachinidae) in Siberia and the Far East. In: Trudy Biologo-pochvennogo instituta DNTs AN SSSR. Fauna i biologiya nasekomykh Dal'nego Vostoka. DNTs AN SSSR, Vladivostok: 35-80.
WSiberia, Far East; PARASITES

471 Kolomiets, N.G. 1987.
Insects - predators and parasites of the gypsy moth (*Lymantria dispar* L., Lepidoptera) in Asian part of the USSR. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. (1):83-89.
-- Synonyms, distribution, host-parasite relations and efficiency of 105 insect species, recorded as natural enemies of gypsy moth in the territory of Soviet Asia, are discussed. The list is compiled from 29 referenced papers. The most important natural enemies are: *Anastatus japonicus, Apanteles melanoscelus, Parasetigena silvestris, Calosoma sycophanta, Dermestes erichsonii,* and *Megatoma conspersa.* The gypsy moth has no egg parasites in the territory of Siberia and the Far East.
WSiberia, ESiberia, Far East; DISTRIBUTION, PARASITES, PREDATORS

472 Kolomiets, N.G. 1990.
Tachinid parasites of *Dendrolimus* and *Lymantria* (Lepidoptera) in the USSR. In: II International Congress on Dipterology. Bratislava, 1990. Bratislava: 116.
-- In different regions of the USSR, 41 tachinid species are related to the gypsy moth, 21 to the nun moth, 22 to the pine moth, and 12 to the Siberian moth. The most widespread are *Exorista fasciata, E. larvarum, Pales palida, Blepharipa pratensis, B. schineri, Masicera sphingivora,* and *Tachina grossa.*
FAUNAL LIST, PARASITES

473 Kolomiets, N.G., Kossinskaya, I.S., Meyer, E.I. 1971.
Forest pests. The most important insects and virus diseases in the forests of Priobye region. (Vragi lesa. Samyye opasnyye nasekomyye i gribnyye bolezni v lesakh Priob'ya.) Zapadno-Sibirskoe knizhnoe izdatel'stvo, Tomsk. 71 p.
WSiberia; PEST LIST, VIRUS

474 Kolosov Yu.M. 1915.
List of field and forest pests of the Urals. In: Zapiski Ural'skogo obshchestva lyubiteley estestvoznaniya. Ekaterinburg: 133-164.
-- Gypsy moth is recorded from different places to the south of Ekaterinburg (Middle Urals).
EEast; PEST LIST

475 Kolosov Yu.M. 1916.
Outline on field pests of the Urals. In: Zapiski Ural'skogo obshchestva lyubiteley estestvoznaniya. Ekaterinburg: 45-58.
-- In Section V the gypsy moth is mentioned as a pest of some regions. It attacked hardwood species, primarily birch. Damage was local (15 to 25 ha of the forest).
EEast; HOST PLANTS, PEST LIST

476 Koltunov, Ye.V. 1982.

Comparative analysis of structural proteins of virons of three nuclear polyhedrosis viruses. Voprosy virusologii. (6):743-747.
WSiberia; BIOCHEMISTRY, VIRUS

477 Koltunov, Ye.V. 1992.
Peculiarities of selectional defoliation of forest stands by gypsy moth under global anthropogenic impact. In: Tekhnogennyye vozdeystviya na lesnyye soobshchestva i problemy ikh vosstanovleniya i sokhraneniya. Institut lesa UrO RAN, Ekaterinburg: 107-123.
-- At the West Siberian plain, gypsy moth outbreaks take place in birch forests growing in the richest soils. The mean radial growth of these forests was much higher than on poor soils, but before outbreak an abrupt decrease of growth was observed.
EEast; PROGNOSIS, STAND CONDITION

478 Koltunov, Ye.V., Ponomarev, V.I., Fedorenko, S.I. 1991.
Effect of gypsy moth outbreaks on structural and functional patterns of forest biocoenosis destroyed by anthropogenic factors in the Urals. In: Dinamika lesnykh fitotsenozov i ekologiya nasekomykh vrediteley v usloviyakh antropogennogo vozdeystviya. AN SSSR, Moskva: 11-27.
EEast; OUTBREAKS, STAND CONDITION, TREE HEALTH

479 Koltunov, Ye.V., Ponomarev, V.I., Fedorenko, S.I. 1991.
Population ecology of the gypsy moth in forest ecosystems destroyed by anthropogenic factors in the Urals. In: Dinamika lesnykh fitotsenozov i ekologiya nasekomykh vrediteley v usloviyakh antropogennogo vozdeystviya. AN SSSR, Moskva: 28-35.
EEast; POPULATION DYNAMICS, STAND CONDITION

480 Kolybin, V.A. 1976.
The role of population structure and intrapopulational heterosis in gypsy moth population dynamics (*Porthetria dispar* L.). Zoologicheskiy zhurnal. 55:844-855.
-- In field and laboratory conditions, the structure, ecological, and physiological peculiarities of numerical dynamics of gypsy moth populations of the Lower Dnieper region were studied. Survival, size, larval coloration, and adult fecundity are shown to be determined by insect origin. Insects produced by crossing specimens belonging to different micropopulations or different morphological groups can have a much higher survival and fecundity, which increases the population fecundity rate. A diagram of intrapopulation heterosis is given and its role in gypsy moth population dynamics is discussed.
EWest; COLOR POLYMORPHISM, GENETICS, GEOGRAPHIC VARIATION, POPULATION DYNAMICS

481 Kolybin, V.A., Kireeva, I.M., Zelinskaya, L.M. 1974.
Biological distinctions of population dynamics of the gypsy moth, *Porthetria dispar* L. Report I. Fecundity. Vestnik zoologii. (2):61-65.
-- A correlation between gypsy moth survival and reproductive ability under different conditions to physiological properties of insects was found. Multiplication and fecundity of insects were determined by the joint action of internal and external factors, the importance of each group being different for different populations, and for different gradation phases.
EWest; PHYSIOLOGY, POPULATION DYNAMICS

482 Kolybin, V.A., Shumov, S.N. 1984.
Dynamics of lysozyme activity in gypsy moth ontogenesis. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 234.
-- Lysozyme activity, one of the factors of insect humoral immunity, was studied in the hemolymph, gut wall, and peritrophic membrane of gypsy moth populations of the Lower Dnieper region feeding on oak and birch. Inhibition of lysozyme activity was found in the peritrophic membrane of feeding larvae. This lysozyme inhibitor does not manifest itself during molts, and its nature is not clear. Increase in bacterial resistance in gypsy moth ontogeny and essential difference in lysozyme activity of insects feeding on different food plants is estimated in terms of the role the lysozyme complex plays in the insect's population dynamics.
EWest; BACTERIA, ENZYMES, HISTOLOGY

483 Kolybin, V.A., Zelinskaya, L.M. 1969.
Ecological and physiological patterns of the gypsy moth population in the Dnieper river region. I.Population structure. Vestnik zoologii. (3):37-42.
-- The normal life cycle of the gypsy moth is found to correspond to the seasonal cycle of development of food plants on which it develops (willow, oak, alder, bastard acacia). In some cases, the difference in egg hatch time related to food species is 10 to 15 days. In the lower Dnieper region, gradation phases in different micropopulations (oak, willow, acacia, alder) begin at different times. Survival of gypsy moth larvae and pupae under natural conditions is different on different food plants. Such a separation of the gypsy moth population into micropopulations contributes to maintaining pest numbers and formation of foci with a seasonal shift, which complicates pest control.
EWest; EGG HATCH, HOST PLANTS, POPULATION DYNAMICS

484 Kolybin, V.A., Zelinskaya, L.M. 1971.
Eco-physiological patterns of the gypsy moth population in the Lower Dnieper region. II. Parasites and diseases. Vestnik zoologii. (1):26-31.
-- Nineteen insect species are reported as parasites and predators of the gypsy moth in the Lower Dnieper region. These consist of 7 species of Hymenoptera: *Hoplectis viduata* Gram., *Phobocampe pulchella* Thoms., *Apanteles vitripennis* Hal., *A. solitarius* Ratz., *Anastatus disparis* Rusch., *Meteorus dubius* Ruthe., and *Brachymeria intermedia*; 6 species of Diptera: *Exorista larvarum* L., *Drino inconspicua* Mg., *Larvivora larvarum* L., *Parasarcophaga harpax* Pand., *P. portschinskyi* Rold., and *Pseudosarcophaga affinis* Fall.; and 6 species of Coleoptera: *Calosoma sycophanta* L., *Dermestes*

erichsonii G., *D. undulatus* Barhm., *D. lardarius* L., *Anthrenus verbasci* L., and *Malachius aeneus* L. The relative importance of the entomophages in gypsy moth dynamics varies in the different stands in the region and is related to the gradation phase. Latent polyhedrosis and microsporidiosis are present in every micropopulation. Epizootics are provoked by deterioration of development conditions caused by factors such as density, food quality, cold, etc. On the whole, entomophages and pathogens are important factors regulating gypsy moth population dynamics.
EWest; PARASITES, POPULATION DYNAMICS, PREDATORS

485 Kolybin, V.A., Zelinskaya, L.M. 1971.
Ecological and physiological patterns of the gypsy moth population in the Lower Dnieper region. III. Effect of diet on the qualitative composition of pupae. Vestnik zoologii. (3):45-49.
-- In the Lower Dnieper region major food plants of the gypsy moth are oak, willow, birch, bastard acacia, and alder, and vary greatly in the leaf qualitative composition according to vegetation time and environmental conditions. In this region bastard acacia is quite suitable for normal growth and development of the pest. Gypsy moth pupae of different micropopulations differ in the content of glycogen carbohydrates, lipids, and proteins. Their content is related not only to food quality but also to living conditions of larvae, which determines future viability and fecundity of adults.
EWest; FOLIAGE QUALITY, HOST PLANTS, PHYSIOLOGY

486 Kolybin, V.A., Zelinskaya, L.M. 1972.
The morphological structure of gypsy moth populations in the Lower Dnieper region. Doklady Akademii nauk Ukrainskoy SSR (Dopovidni Akademii Nauk Ukrains'koy RSR). (3):278-281.
-- Four types of larvae are distinguished according to coloration of hairs, warts, hypodermis, and head capsule. The first type are light-colored larvae with light hairs and bright yellow lateral stripes; the second type, light-colored larvae with light and dark hairs and grey-yellow lateral stripes; the third type, grey larvae with grey and black hairs with a largely distinguishable lateral stripe; and the fourth type grey larvae with a black dorsal stripe. The most viable are larvae of the third type. A conclusion is made that in different groups of larvae genotypes are different and that ratio of genotypes is related to the physiological condition of the population.
EWest; COLOR POLYMORPHISM, GENETICS

487 Kolybin, V.A., Zelinskaya, L.M. 1974.
The outlook of biological control methods for the gypsy moth in the Lower Dnieper. In: Patologiya chlenistonogikh i biologicheskiye sredstva bor'by s vrednymi organizmami. Tezisy dokladov 1 gorodskoy konferentsii. Kiev: 97-99.
-- In the Lower Dnieper region, a gypsy moth population can be subdivided into a number of micropopulations inhabiting certain stations and feeding on certain plants. The part played by entomophages and diseases in regulating a pest population in these micropopulations is different and also depends on the gradation phase, where it is highest at the eruption phase and lowest at the prodromic and outbreak phases. Experiments were carried out to test tolerance of gypsy moth larvae to entobacterin with sublethal doses of chlorophos. The results showed that treatments with such mixtures can stimulate epizootics in gypsy moth foci if the percentage of insects carrying a latent virus is high.
EWest; BACTERIA, CHEMICAL INSECTICIDES, MICROBIAL PESTICIDES, VIRUS

488 Kolybin, V.A., Zelinskaya, L.M. 1975.
The role of behavior in gypsy moth population dynamics in the Lower Dnieper region. In: Povedeniye nasekomykh kak osnova dlya razrabotki mer bor'by s vreditelyami sel'skogo i lesnogo khozyaystva. Naukova Dumka, Kiev: 75-82.
-- Due to gypsy moth behavioral characteristics that developed during the course of evolution, the species is widespread in certain environmental conditions, and the population remains heterogenous owing to formation of micropopulations and the exchange of migrants. Different species can be used as food plants, thus creating favorable conditions for the maximum bioproductivity of a population. Tabular data are shown on eggs per mass, egg masses per tree, and mean egg weight in different phases of the population cycle and the effect of different host plants on these same variables.
EWest; FECUNDITY, HOST PLANTS

489 Kolybin, V.A., Zelinskaya, L.M. 1975.
Distinctions of gypsy moth control relative to structural and functional features of a population. In: VIII Mezhdunarodnyy kongress po zashchite rasteniy. Tezisy dokladov sovetskikh uchastnikov kongressa. Moscow: 230-231.
EWest; CONTROL, PROGNOSIS

490 Kolybin, V.A., Zelinskaya, L.M. 1976.
Biological backgrounds of gypsy moth population dynamics. II. Role of sex ratio. Vestnik zoologii. (4):25-37.
-- Due to different developmental periods for males and females, adult males emerge much earlier than females from the same egg mass. In addition, there are differences in pest phenology in the foci of different densities and species composition of food plants. Adults emerge earlier in the foci where density is high. As to different food plants, hatching first occurs in willow populations, then in oak, and finally in acacia, thus maintaining population heterogeneity. Ecological hybrids of high adaptability and ecological valence appear, allowing the species to prosper under various conditions. These factors are significant for biological mechanisms that regulate pest populations.
EWest; EGG HATCH, HOST PLANTS, PHENOLOGY

491 Kolybin, V.A., Zelinskaya, L.M., Barabanova, V.V. 1968.
Ecophysiological characteristics of a gradation population of gypsy moth, *Porthetria dispar* L., in the Lower Dneiper Region (in French). [Les caracteres ecophysiologiques de la population et la gradation de

Porthetria dispar L. dans la Region le Bas-Dniepre.] In: Trudy XIII Mezhdunarodnogo entomologicheskogo kongressa. Nauka, Moscow: 400-401.
-- Data are given on ecological and physiological differentiation of the gypsy moth and the importance of these factors for species population dynamics. In the Lower Dnieper region, gypsy moth populations exist as separate micropopulations related to different food plants. Major food plants of the gypsy moth in the given region are oak, white willow, Dnieper birch, and alder. Micropopulations differ in phenological parameters of insects (different hatching time), fecundity and survival, and the manner in which biochemical processes occur according to peculiarities of the host plant. Investigations made in the Lower Dnieper population during 10 years revealed differences in population dynamics of separate micropopulations; the adaptive role of these differences was suggested.
EWest; HOST PLANTS, POPULATION DYNAMICS

492 Komissarenko, S.V., Gerasimova, T.B. 1982.
Patterns of primary extraction and passage of a nuclear polyhedrosis virus of the gypsy moth in homologous cell culture. Molekulyarnaya biologiya. 31:55-59.
-- This reference contains a description of the primary extraction of a nuclear polyhedrosis virus of the gypsy moth from a homologous inoculation culture of IPLB-65 cells, using Greis medium containing hemohydrolysate and chick embryo extract as substitutes for cattle embryo serum. A test has been made to compare sensitivity of the cells of this strain and of the strain SCLD-135 for passage of a homologous virus (strain K-1). This strain causes generation of polyhedra in nuclei of the cells of the inoculation strains used.
CELL CULTURE, VIRUS

493 Komissarenko, S.V., Skuratovskaya, I.N. 1980.
The use of a cooling procedure to synchronize the infectious process in gypsy moth inoculating cell culture affected by nuclear polyhedrosis virus. In: Trudy Latviyskoy sel'skokhozyaystvennoy akademii. Riga: 48-51.
-- Synchronization of gypsy moth inoculated cells by cooling is suggested. A strain of gypsy moth cells, SCLD-135, received from France was used in the experiments. Cooling contributed to synchronization of the process of infection in the inoculation culture of gypsy moth cells when inoculation was made with virus material of low multiplicity of infection (1-7 BOE per cell).
EWest; CELL CULTURE, TEMPERATURE, VIRUS

494 Komissarenko, S.V., Sutugina, L.P., Zherebtsova, Ye.N. 1979.
Formulation of plaque: a method for studying properties of a nuclear polyhedrosis virus. In: Metody molekulyarnoy biologii. Naukova Dumka, Kiev: 22-216.
EWest; HISTOLOGY, VIRUS

495 Kondakov, Yu.P. 1958.
Gypsy moth as an abundant forest pest in the South of Krasnoyarsk Territory. In: Nauchno-proizvodstvennaya konferentsiya. Osnovy vedeniya khozyaystva v lesakh Sibiri. Tezisy dokladov. Izd. Sibirskogo lesotekhnicheskogo instituta, Krasnoyarsk: 15-17.
WSiberia; GENERAL BIOLOGY

496 Kondakov, Yu.P. 1959.
Coincident outbreaks of *Dendrolimus sibirikus* Tshtv., *Ocneria dispar* L., and *Semiothisa pumila* Kusn. in the deciduous forests of the Krasnoyarsk Territory. In: Uchenyye zapiski Krasnoyarskogo gosudarstvennogo pedagogicheskogo instituta. Krasnoyarsk: 183-194.
-- Outbreaks of some forest pests in southern Khakassia (southern part of Krasnoyarsky Krai) occur simultaneously. These pest species are: the gypsy moth, the Siberian moth, the larch looper, pine sawflies, the larch leaf roller, the pine looper, the vaporer moth, the haw moth, etc. Simultaneous emergence of various pest species in great numbers must be related primarily to cenosis variability and the resulting qualitative changes in food species and their pests.
WSiberia; FOLIAGE QUALITY, OUTBREAKS, PEST LIST

497 Kondakov, Yu.P. 1961.
Distribution of the gypsy moth egg clusters in the forests of the Krasnoyarsk Territory. In: Uchenyye zapiski Krasnoyarskogo gosudarstvennogo pedagogicheskogo instituta. Krasnoyarsk: 17-32.
-- The author considers the following aspects: distribution of gypsy moth masses and behavior of first instars and adults in migrations in the plain and mountain taiga forests of the Krasnoyarsk Krai. In the plain forests, egg masses are deposited on thick pines (unfavored food species), and larvae migrate to birch underwoods (favorable food species). In the mountains, egg masses usually are deposited on rocks, which provide optimum conditions for settlement of first instars. Females migrate there from emergence sites, which are sometimes as far as 7 km away. Adults of the Krasnoyarsk population fly rather well and female migrations are fixed by evolution.
WSiberia; FEMALES, FLIGHT, HOST PLANTS, OVIPOSITION SITE

498 Kondakov, Yu.P. 1963.
The gypsy moth, *Ocneria dispar*, in the forests of the Krasnoyarsk Territory. In: Zashchita lesov Sibiri ot nasekomykh-vrediteley. Izd. AN SSSR, Moscow: 30-77.
-- The work describes the location under study, procedure of investigation, data on gypsy moth distribution in the forests of Krasnoyarsk Krai, morphological and bio-ecological peculiarities of gypsy moth population, dispersal of gypsy moth adults and larvae, pest phenology, and food plants in Krasnoyarsk Krai. Population dynamics in the 20th century is traced. Data are presented on pest economic importance, biocenotic relations to dendrophilous pests, and pest control measures in Krasnoyarsk Krai.
WSiberia; CONTROL, HOST PLANTS, PHENOLOGY, POPULATION DYNAMICS

499 Kondakov, Yu.P. 1979.
Gypsy moth and its entomophages in the forests of the West Zabaikalye. In: Zapiski Zabaykal'skogo filiala Geograficheskogo obshchestva SSSR. Chita: 88-89.

-- In 1972-1975, the total area infested by the gypsy moth in the Selenga River Basin was about 350,000 ha. Hardwood and larch forests were the most damaged species, as determined by peculiarities of regional oligophagy of larvae. Gypsy moth populations in the West Baikal region had a number of specific properties. In this region, migrations of adults are of great importance for gypsy moth population dynamics, and parasites were more important than diseases for regulating gypsy moth populations.
ESiberia; DISPERSAL, FLIGHT, PARASITES

500 Kondakov, Yu.P. 1979.
Needle- and foliage chewing insect pests in the forests of the Lake Baikal basin. In: Fauna lesov basseyna ozera Baykal. Nauka, Novosibirsk: 5-42.
-- Pages 37-41 are devoted to the main biological peculiarities of the gypsy moth populations in Southern Transbaikalia.
ESiberia; GENERAL BIOLOGY

501 Kondakov, Yu.P. 1987.
Phytocenotic characteristics of leaf and needle eating insects outbreaks in Siberian forests. In: Ecologicheskaya otsenka mestoobitaniy lesnykh zhivotnykh. Nauka, Novosibirsk: 29-40.
-- Brief data are provided on fecundity of different gypsy moth populations in Siberia.
WSiberia; FECUNDITY

502 Kondakov, Yu.P., Kondakov, S.Yu. 1982.
Age structure of gypsy moth populations in South Siberia. In: Neparnyy shelkopryad v Sredney i Vostochnoy Sibiri. Nauka, Novosibirsk: 58-67.
-- The specific demographic structure of gypsy moth populations in the mountain forests of South Siberia is discussed. Regulations of variations of morphological parameters of larvae were studied in the laboratory and in the field.
WSiberia; MORPHOLOGY, POPULATION DYNAMICS

503 Kondakov, Yu.P., Tarasova, O.V. 1981.
Landscape-ecological characteristics of folivorous insects in the shelterbelt pine-forests of Minusinsk Kettle. In: Fauna i ekologiya chlenistonogikh Sibiri. Nauka, Novosibirsk: 149-151.
-- Specific environmental conditions of Minusinsk forest belts account for landscape-ecological peculiarities of aboriginal populations of phyllophagous insects such as the pine sawfly, the pine moth, the pine noctuid, the gypsy moth and other pests. Primary foci of the gypsy moth are found in the peripheral part of forest belts, primarily in shrub-herb birch stands and aspen stands. High concentrations of pest egg masses are observed in pine forests with dense undergrowth of Siberian pea shrub growing in elevated places.
WSiberia; PEST LIST, STAND COMPOSITION

504 Kondakov, Yu.P., Zemkova, P.I., Nakrokhina, O.I. 1967.
A study of the effect of food species and population density on gypsy moth development and fecundity. In: Itogi izucheniya lesov Dal'nego Vostoka. Vladivostok: 247-250.
-- Experiments were conducted in the laboratory and in the field on 10 tree and shrub species with different pest densities. Feeding conditions of larvae determine the rate of their development, survival and fecundity. The favored food plants of the gypsy moth in South Siberia are larch and birch.
WSiberia; DENSITY, HOST PLANTS, REARING

505 Kondorskiy, B.M. 1982.
Comparative estimation of efficacy of a visual method for determining vitality of gypsy moth eggs. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Moskva: 49-54.
-- Data on potential and actual viability of egg masses were analyzed. A correlation was established between egg viability and microclimatic peculiarities of foci, egg mass sizes, and position of eggs in the egg mass.
ECentral; EGGS

506 Kondorskiy, B.M. 1982.
Methodical aspects of planning control measures against the gypsy moth. In: Zashchita rasteniy i okhrana okruzhayushchey sredy v Tatarskoy ASSR. Kazan': 93-95.
CONTROL

507 Kondorskiy, B.M. 1983.
Preference index of food species by ovipositing gypsy moth females and its alteration pattern in time and space. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Moscow: 213-218.
-- Natural populations of the gypsy moth were studied in forestries of Tatarstan and, as a result, an index of the food species preferred by females during oviposition was suggested.
EEast; HOST PLANTS, OVIPOSITION SITE

508 Kondorskiy, B.M. 1984.
Patterns of outbreak realization by the gypsy moth in the Tataria region. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 237.
-- The main parameters of gypsy moth outbreaks are related primarily to entomoresistance of stands. In the Tatarstan "island" pure oak groves of a grass-sedge type are regarded as having low entomoresistance, mixed oak groves have medium entomoresistance, and birch, linden and aspen stands are highly resistant. In Tatarstan, gypsy moth outbreaks tend to spread.
EEast; STAND COMPOSITION

509 Kondorskiy, B.M. 1988.
Alteration pattern of gypsy moth fecundity during an outbreak. In: Neparnyy shelkopryad: itogi i prespektivy issledovaniy. Institute lesa i drevesiny SO AN SSSR, Krasnoyarsk: 12-13.
-- In Tatarstan in 1978-1983, gypsy moth foci were studied with regard to some regularities of fecundity variations in space (within separate foci) and in time (in the course of outbreak). Fecundity is higher during the period of population increase, and lower at the eruption

phase. At the crisis phase it remains at a low level. Higher fecundity at the beginning of a depression stabilizes at a level related to the level of stand entomoresistance. Five phases of fecundity variation can be distinguished in the course of gypsy moth outbreak and depression: increase, decrease, depression, recovery, and stabilization.
EEast; FECUNDITY, POPULATION DYNAMICS

510 Kondorskiy, B.M. 1989.
Ecology of gypsy moth population dynamics in the forest steppe of Moldavia. In: Ekologicheskiye osnovy okhrany i vosproizvodstva lesnykh resursov Moldavii. Respublikanskaya nauchno-prakticheskaya konferentsiya. Tezisy dokladov. Kischinev: 201-203.
EWest; ECOLOGY

511 Kondrya, V.A., Tret'yakova, M.F., Lipilchuk, M.D., Smelyy, V.L. 1980.
Testing of biopreparations against leaf-gnawing lepidopetrous larvae in orchards. Biologicheskiy zhurnal Armenii. (4):439-441.
Caucasus; BACTERIA, BIOASSAY, MICROBIAL PESTICIDES, PEST LIST

512 Konicheva, A.P., Kuznetsova, L.V., Orlovskaya, Ye.V., Zinov'eva, L.A., Tsvetaeva, I.A. 1979.
Amino acid composition of artificial diet used for rearing the gypsy moth, *Lymantria dispar* L. In: Trudy Moskovskogo gosudarstvennogo pedagogicheskogo instituta im. V.I.Lenina. Moscow: 132-138.
-- Amino acid composition of natural food of the gypsy moth (oak leaves of different vegetation periods) was compared with artificial nutrient media (ANM:BM-2, BM-12, No 14, No 14-a, No 144 us, No 144-IV). ANM examined were found to have all the amino acids necessary for normal development but their amount and ratio did not meet requirements for the gypsy moth, especially for the earlier instars. It is suggested that amino acids should be added to ANM, the proportion calculated by comparing amino acid composition of ANM and oak leaves.
ECentral; ARTIFICIAL DIET, FOLIAGE CHEMISTRY, NUTRITION, REARING

513 Konicheva, A.P., Orlovskaya, Ye.V., Shershukova, L.S. 1984.
Evaluation of the level of metabolic processes in prolonged storage of silkworm eggs according to enzyme activity of their homogenates. In: Trudy Moskovskogo gosudarstvennogo pedagogicheskogo instituta im. V.I.Lenina. Moscow: 25-28.
ECentral; EGGS, ENZYMES

514 Konicheva, A.P., Orlovskaya, Ye.V., Tsvetaeva, I.A. 1984.
Use of enzymic tests to improve the nutrient medium for insects by addition of certain amino acids. In: Biokhimiya nasekomykh. MGPI, Moscow: 38-125.
ECentral; NUTRITION, PHYSIOLOGY

515 Konicheva, A.P., Orlovskaya, Ye.V., Zinov'eva, L.A. 1981.
Comparative characteristic of soluble proteins in the tissues of gypsy moth larvae affected by nuclear polyhedrosis virus and reared on natural and artificial diet. In: Trudy Moskovskogo gosudarstvennogo pedagogicheskogo instituta im. V.I.Lenina. Moscow: 143-150.
ECentral; ARTIFICIAL DIET, BIOCHEMISTRY, REARING, VIRUS

516 Konicheva, A.P., Orlovskaya, Ye.V., Zinov'eva, L.A., Tsvetaeva, I.A. 1979.
Carbohydrate composition of artificial diet and natural food of the gypsy moth. In: Trudy Moskovskogo gosudarstvennogo pedagogicheskogo instituta im. V.I.Lenina. Moscow: 139-144.
-- A comparison was made of carbohydrate composition and natural food of the gypsy moth (oak leaves) and artificial nutrient media (ANM:14, 14-a, BM-16, MP-8, BAC). In the quantitative composition of soluble carbohydrates, the ANM examined are similar to those in oak leaves but quantitatively they are markedly different in the content of all the carbohydrates. A conclusion is made that to provide normal development of gypsy moth it is necessary to lower the content of carbohydrates in the ANM examined.
ECentral; ARTIFICIAL DIET, FOLIAGE CHEMISTRY, NUTRITION, REARING

517 Konikov, A.S. 1974.
Role of physiological factors in the population structure of the Siberian moth and the gypsy moth. In: Materialy VII s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Leningrad: 222-223.
-- Larval polymorphism was observed in a number of parameters in both species. Early instars living in groups have much higher levels of energy processes and lower mortality than insects living singly. In later instars, digestive enzymes of small larvae are blocked and larvae die. Polymorphism, group effect and hierarchy regulate populations of these species, while physiological regulators operate at the population level.
WSiberia; PHYSIOLOGY, POPULATION QUALITY

518 Konikov, A.S. 1978.
Regulators of forest insect population density. (Regulyatory chislennosti lesnykh nasekomykh.) Nauka, Novosibirsk. 96 p.
-- The monograph presents information on population dynamics of some forest insects with regard to exogenic and endogenic regulating factors. The gypsy moth is used as an example to show regulating mechanisms.
WSiberia; POPULATION DYNAMICS

519 Konikov, A.S. 1980.
Population structure of a species and the role of system interrelationships in taiga forest ecosystems. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 69-70.
-- The Siberian moth and the gypsy moth are used as examples for considering the role of some exogenic and

endogenic factors in numerical dynamics of forest insects at population levels.
WSiberia; POPULATION DYNAMICS

520 Konikov, A.S., Aleksandrova, S.P., Aleksandrina, I.G. 1977.
Regulatory mechanisms of the abundance of forest insects. In: Problemy lesovedeniya Sibiri. Nauka, Moscow: 215-225.
WSiberia; DENSITY, FEEDING, PHYSIOLOGY

521 Konikov, A.S., Chernyshova, L.V. 1981.
Heritable mechanisms regulating gypsy moth population density and behavior. In: Fauna i ekologiya chlenistonogikh Sibiri. Nauka, Novosibirsk: 57-60.
-- Egg mass peculiarities (whether singly or in aggregation), the synchronous or asynchronous character of egg hatch, the ability of larvae to aggregate, and the resulting group effect are population level responses, that affect the regulation of insect numbers. Adaptation mechanisms of ecologically flexible species are related to "imprinting" of trace responses of earlier conditions. For instance, trace aftereffects can cause a 5-fold reduction of gypsy moth protease activity. All the behavioral responses of gypsy moth larvae are genetically fixed, and their manifestation is corrected by trace responses (the "memory" of developmental conditions of the previous generation). On the basis of the analysis of species population structure, the term "population" can be defined as a group of individuals of one species occupying a certain area for a long time, freely crossing and united by genetic intrapopulation relations of an ecological nature.
WSiberia; BEHAVIOR, EGGS, GENETICS, PHYSIOLOGY

522 Konikov, A.S., Chernyshova, L.V., Alexandrina, I.G., Shakhmatova, I.G. 1982.
Some regulators of trophic connections and behavior in gypsy moth. In: Neparnyy shelkopryad v Sredney i Vostochnoy Sibiri. Nauka, Novosibirsk: 42-51.
-- Selection of food plant by gypsy moth larvae is determined by imprinting at different life stages. Data on variations in larval growth when feeding on different food plants are given.
WSiberia; BEHAVIOR, FEEDING, HOST PLANTS, NUTRITION

523 Kononova, N.Ye. 1964.
The role of plant condition in the survival of folivorous insects. Zoologicheskiy zhurnal. 43(1):37-42.
-- Effect of feeding on the biological parameters of the tent caterpillar and the gypsy moth, under natural conditions and on branches in the laboratory, was studied. Larvae reared on branches had a higher survival and a more steady and rapid development than larvae reared on trees. Mechanical injury of plants, which causes deterioration of their physiological condition, has a favorable effect on pest survival and fecundity, leading to a sharp increase in their number. Of great importance is that trees come into leaf at the time of egg hatch. If hatched larvae of the species under study feed on old leaves, the majority of insects die. First instars can die from feeding on healthy plants, with clear signs of poisoning, which means that the sap of healthy plants is toxic for at least a portion of the pest population. Thus, the physiological condition of food plants proved to produce an essential effect on tent caterpillar and gypsy moth populations.
ECentral; FEEDING, FOLIAGE QUALITY, REARING

524 Korchagin, V.N. 1980.
The gypsy moth. Zashchita rasteniy. (11):64-65.
ECentral; GENERAL BIOLOGY

525 Korduba, P.T. 1958.
Important folivorous entomophages in the oak stands of the Carpathian region. In: 1 Mezhvuzovskaya konferentsiya po zashchite lesa. Tezisy dokladov. Moskva: 49-51.
-- Oak stands in the Carpathian region were most often attacked by the gypsy moth and the tent caterpillar; less important pests were the green oak leaf roller, the browntail moth, and the processionary moth. In 1953, gypsy moth populations increased, and browntail moth, green oak leaf roller, and tent caterpillar populations also increased to some extent. In 1954, the area of foci was about 14,000 ha, and the foci were found mainly in very light stands with a density of 0.3-0.5 poor young growth and poor or no undergrowth. Egg masses were primarily deposited on a well heated part of the trunk from top to bottom, and in locations with high humidity; they also were deposited in the crown and on thin branches, which the author associated with the hydrothermal optimum. Females oviposited not only on oak, but on hornbeam and other hardwood species. During the outbreak period, there were 15 to 30 egg masses per tree, with 200 to 300 eggs per mass. The highest egg mass concentration was observed near settlements. The greatest outbreaks were recorded in 1949, 1952, and 1956. The author believes that frequent occurrence of outbreaks is the result of entomophage destruction by large-scale application of pesticides.
EWest; FECUNDITY, OUTBREAKS, OVIPOSITION SITE, STAND COMPOSITION

526 Korenev, A.A., Kondorskiy, B.M. 1987.
The role of oligophagous tachinid flies in reducing gypsy moth population density during pest depression. In: Entomophagi i mikroorganizmy v zashchite rasteniy. Kishinev: 54-59.
-- A correlation is established between decrease in gypsy moth density and parasitism of larvae by oligophagous tachinids. A descriptive table of adult tachinid parasites of the gypsy moth in Moldavia is given.
EWest; PARASITES, POPULATION DYNAMICS

527 Korotun, N.N. 1931.
The gypsy moth. In: Shkidlivi komakhi v sadakh na Polissi ta borot'ba z nimi. Vid.VUAN, Kiev: 13-32.
-- The gypsy moth was the most destructive pest in the Volyn Province in 1825-1827, in the Kazan Province in 1852, in the Ryazan and Tambov Provinces in 1857, and in Voronezh, Moscow, Kostroma, Yaroslavl, Kazan, Niznby Novgorod and Perm Provinces in 1893-1895. Life cycle, biology, phenology, and favored food plants are briefly described. Hairs of caterpillars are observed to cause skin irritation. Data are given on destructive effect

and control measures, such as egg mass collection and treatment with petroleum, and application of sticky belts.
ECentral, EEast; CONTROL, GENERAL BIOLOGY

528 Kosminskiy, P.A. 1921.
Experiments on extraction of gynandromorphs in *Lymantria dispar* L. (preliminary report). Russkiy zoologicheskiy zhurnal. 4(2):197-206.
-- Data are given on changes observed in morphological parameters of gypsy moth adults emerging from pupae that had been exposed to high temperatures (39ºC) for 12-36 hours. The action of high and low temperatures was found to bring about the occurrence of intersexes. The data obtained are discussed along with R. Goldschmidt's data.
ECentral; GENETICS, MORPHOLOGY, TEMPERATURE

529 Kosminskiy, P.A. 1924.
Some data on the development of gypsy moth antennae in terms of intersexuality phenomena. Russkiy zoologicheskiy zhurnal. 4(3-4):134-140.
-- The development of gypsy moth antennae of males and females under normal conditions and with regard to phenomena of intersexuality were studied. Data are discussed invoking R. Goldschmidt's materials and conclusions.
ECentral; GENETICS, MORPHOLOGY

530 Kosminskiy, P.A. 1925.
Gynandromorphism in the gypsy moth. Russkiy zoologicheskiy zhurnal. 5(1-2):3-24.
-- Gynandromorphs are produced by abnormal food, which causes partial starvation and general weakening. Most females remain sterile. Such conditions are supposed to affect the process of nucleus division and result in production of insects with a triple set of chromosomes (3n), causing a mixture of male and female characteristics in one individual. This supposition, however, was not confirmed by further studies. Offspring of the first generation after crossing were normal, while gynandromorphs were produced in the second generation. Thus, it is supposed that females are responsible for gynadromorphism. In addition to unfavorable food, gametes are also affected by high temperatures.
ECentral; GENETICS, MORPHOLOGY

531 Kosminskiy, P.A. 1929.
Inheritance of hypodermis and color patterns by larvae of the gypsy moth, *Lymantria dispar* L. Russkiy zoologicheskiy zhurnal. 9(1):3-61.
-- This is a detailed analysis of gypsy moth color races in different regions of the USSR. The author differentiates among races based on chitin coloration and hypodermis pattern. According to chitin coloration, two races are differentiated: dark, with a dark shade of chitin, and light, with light chitin. According to hypodermis coloration, yellow, grey and black races are differentiated. The work presents materials on crossing of individuals of different races, genetic analysis of crossing results, data on the effect of temperature on manifestation of some characters, and comparison of the data with materials and conclusions of R. Goldschmidt.
ECentral; COLOR POLYMORPHISM, GENETICS, TEMPERATURE

532 Kosminskiy, P.A. 1930.
An investigation of intersexuality in the gypsy moth. (Part I.). Russkiy zoologicheskiy zhurnal. 10(2):1-50.
-- Occurrence of gypsy moth intersexuality within one race was studied. It is pointed out that intersexuality is transmitted by females and must be caused by mutation of F-factor determining development towards females. The author discusses his data and compares them to those of R. Goldschmidt.
ECentral; GENETICS

533 Kosminskiy, P.A. 1935.
Investigations of intersexuality in the gypsy moth, *Lymantria dispar* L. Part II. Morphological study of intersexual males. Zoologicheskiy zhurnal. 14(1):113-158.
-- Crossings made to study inheritance of intersexuality by different interracial hybrids of the gypsy moth are analyzed and the results obtained are compared to those of R. Goldschmidt. Morphological investigation of intersexes obtained is described in detail and compared with normal insects obtained in R. Goldschmidt's experiments. In the Section "Gypsy Moth Sex Differences," a comparison is made of the normal construction of wings, antennae, sex organs, and the dynamics of their development, as well as time of morphological differentiation in ontogeny. Data on changes in various systems of organs in intersexes and dynamics of their development also are included, as well as data on homology of male and female organs and their changes in intersexes.
EWest; GENETICS, MORPHOLOGY

534 Kosminskiy, P.A. 1935.
Investigations of intersexuality in the gypsy moth, *Lymantria dispar* L. Part IV. General conclusion. Zoologicheskiy zhurnal. 14(4):621-636.
-- This is a study of gypsy moth intersexuality on the basis of genetic analysis. R. Goldschmidt's theory of gene quantitative changes is criticized.
EWest; GENETICS, MORPHOLOGY

535 Kosminskiy, P.A. 1935.
Investigations of intersexuality in the gypsy moth, *Lymantria dispar* L. Part II. Morphological study of intersexual males. Zoologicheskiy zhurnal. 14(2):271-310.
-- The author discusses the interrelationships existing when various systems of organs in intersexes change, the and occurrence of intersexuality in some variants of crossing. A long summary follows in which the author argues with R. Goldschmidt on the basis of the data obtained regarding conclusions made by Goldschmidt as a result of his studies on intersexuality. In conclusions this debate continues; in each of the 10 parts a comparison is made of the data obtained by the author and R. Goldschmidt.
EWest; GENETICS, MORPHOLOGY

536 Kosminskiy, P.A., Vershaver, N.B. 1935. **Investigations of intersexuality in the gypsy moth, *Lymantria dispar* L. Part III. Intersexual changes induced by temperature.** Zoologicheskiy zhurnal. 14(3):439-464.
-- Changes towards intersexuality occurring in males and females under the influence of temperature are considered and a possible explanation of the reasons for such changes is suggested. The data obtained are discussed together with R. Goldschmidt's data.
EWest; GENETICS, MORPHOLOGY, TEMPERATURE

537 Kost, A.N., Kovalev, B.G., Matveeva, Ye.D., Stan, V.V., Yudin, L.G., Elizarov, Yu.A., Barybkina, M.N. 1977. **Synthesis and biological activity of disparlure and its analogues.** Bioorganicheskaya khimiya. (7):934-942.
-- Stereodirected synthesis of the attractant cis-7, 8-epoxy-2-methyloctadecan (disparlure) is made. To estimate the role of the substance structure in interaction with the gypsy moth chemoreceptor, a number of disparlure analogues were synthesized. The synthesis was based on alkylation of acetylene hydrocarbons in hexametafield, allowing dialkylacetylenes with outputs of 35-45% to be obtained. To produce cis-olefins, hydration was made over Lindlar catalyst. By epoxidating olefins, disparlure, its homologues and isologues, differing in the length of carbohydrate chain and position of epoxy bridge, were produced. This analogue and trans-isomer of disparlure were synthesized. The attractive power of compounds produced was analyzed.
ECentral; BIOASSAY, PHEROMONES, PHYSIOLOGY

538 Kostin, I.A. 1958. **Comparative characteristic of outbreak fading dynamics of the Siberian moth and the gypsy moth in East Kazakhstan.** In: I-ya mezhvuzovskaya konferentsiya po zashchite lesa. Tezisy dokladov. Moscow: 56-58.
-- Outbreaks of the Siberian moth and the gypsy moth are provoked by similar weather conditions. In 1951-1956, considerable defoliation of both hardwood and coniferous species was first recorded. Foci collapsed due to the action of self-regulating mechanisms but the process was different in Siberian moth and gypsy moth. An outbreak of the former species stopped abruptly; decrease in numbers of the latter was gradual. This can be accounted for by nearly all foci eggs of the Siberian moth being parasitized by *Telenomus grandis* Mayr., while this parasite attacked very few eggs of the gypsy moth. Siberian moth larvae migrate little if at all, unlike gypsy moth larvae, thus disease development is more rapid for the Siberian moth.
CAsia; EGGS, OUTBREAKS, PARASITES, WEATHER

539 Kostin, I.A. 1958. **Gypsy moth outbreak in East Kazakstan in 1953-1955.** In: Trudy instituta zoologii AN Kazakhskoy SSR. Alma-Ata: 118-121.
-- Pest gradation foci originated in areas well heated by the sun and protected from northerly winds. Unlike the Siberian moth, the gypsy moth is dispersed by winds from its primary foci. Its food plants are birch, aspen, and fir and, in flood plains, willow. In the undergrowth it attacked bird cherry, Siberian pea shrub, mountain ash, May rose, sweetbrier, honeysuckle, raspberry, spiraea, etc. Foci, however, were formed only on bird cherry and birch. Feeding on fir can be accounted for by high population and lack of food.
MAsia; HOST PLANTS, SITE CONDITIONS

540 Kostin, I.A. 1967. **An integrated method of gypsy moth control.** Vestnik Akademii nauk Kazakhskoy SSR. (10):75-76.
-- In the forests of the Altai Mountains a great many gypsy moth females oviposit on the rocks in the upper parts of mountain ridge slopes. Good results on aggregated egg masses were achieved by aerial treatments of DDT. It is suggested that females should be attracted to places suitable for oviposition by light sources so that egg masses are concentrated, facilitating their destruction.
WSiberia; AERIAL SPRAYING, CHEMICAL INSECTICIDES, CONTROL, LIGHT TRAPS, OVIPOSITION SITE

541 Kostin, I.A. 1968. **Innovations in gypsy moth control in Kazakhstan.** In: Trudy XIII Mezhdunarodnogo entomologicheskogo kongressa. Nauka, Moscow: 58-59.
-- Gypsy moth outbreaks occur in Altai every decade. During the last 30 years, the maximum numbers were recorded in 1946, 1955, and 1966. For pest control, it was suggested that aerial treatments of oviposition sites should be made during the period of egg hatch. Females that are active in twilight fly to well heated areas during the day, and to rocks that are clearly seen in the evening, on the upper, primarily southwestern, mountain slopes; about 90% of the egg masses are deposited in these conditions. The author believes that these places are chosen for oviposition by gypsy moth populations in Altai because, on the one hand, eggs are well heated in spring, and on the other hand, unfavorable factors, abiotic ones included, can be avoided. Hatched larvae readily find suitable food due to their aerophorous nature. Detection of the sites where egg masses are concentrated would make it possible to reduce treatment of vast areas with pesticides and reduce the damage caused by the gypsy moth to economically acceptable levels.
WSiberia; CONTROL, FEMALES, FLIGHT, OVIPOSITION SITE

542 Kostin, I.A., Garynin, A.V. 1968. **Gypsy moth control in the Altai Territory.** Lesnoye khozyaystvo. (9):65.
-- In the Altai Territory, gypsy moth females oviposit on bare rocks of southwestern slopes and on mountain crests. The authors suggest that treatment of aggregations of hatched larvae in the sites where egg masses are aggregated should be made before active migrations start. Such a control method proved to be quite satisfactory in all respects: the pest number in the stands sharply decreased and major entomophages were preserved in the forests. This method was 10 times less costly than treatment of all damaged stands after migration of larvae to the trees. Knowing what sites the gypsy moth prefer makes monitoring the condition of pest populations in periods between outbreaks more effective.

WSiberia; CONTROL, OVIPOSITION SITE

543 Kotenko, A.G. 1974.
The ecology of dermestid beetles (Coleoptera, Dermestidae) - entomophages of the gypsy moth *Lymantria dispar* L. (Lepidoptera, Lymantriidae). In: Materialy VII s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Leningrad: 224-225.
-- Species composition of dermestids and their role in the entomophage complex of the gypsy moth were studied from 1968-1972 in the Lower Dnieper region. In this region, 5 dermestid species ecologically related to the gypsy moth are recorded: *Dermestes lardarius* L., *D. undulatus* Brahm., *D. erichsoni* Gangld., *D. bicolor* F., and *Anthrenus verbasci* L. The most common are *D. undulatus* and *D. bicolor* which, together with *D. lardarius*, are conventionally regarded as belonging to the group of dermestids living on nesting birds. In the Black Sea Preserve, where most surveys were made, there were a lot of nest boxes for starlings in which gypsy moth females often oviposited and, as a result, egg predation by dermestid larvae in these artificial nests reached 100%. Egg masses deposited on tree trunks are attacked to a lesser extent (up to 70% on the average). On the average, 66% and 29% of eggs, respectively, were destroyed. Damage inflicted on the pest by dermestids declines markedly as the distance to sites with artificial nests increases.
EWest; BIRDS, EGGS, PREDATORS

544 Kotenko, A.G. 1975.
Studies of the biology of the tachinid fly, *Parasetigena agilis* R-D. (Diptera, Tachinidae), an effective parasite of the gypsy moth (Lepidoptera, *Ocneria dispar* L.) in southern Ukraine. In: Nekotoryye voprosy ekologii i morphologii zhivotnykh. Naukova dumka, Kiev: 29-31.
-- In southern Ukraine, *Parasetigena agilis* adults emerge from puparia in late April or early May and begin to parasitize their hosts by mid-May. They prefer late instars, beginning with the third instar; first instars are not parasitized at all, and second instars are rarely parasitized. Larger prey provide parasites with a larger store of food and allows the parasite to avoid, to some extent, competition by hymenopterous parasites of early instars. Flies cannot differentiate between infected, diseased, molting, and healthy larvae, so they can parasitize hosts on which they are not able to develop. As a result, a portion of the offspring dies, lowering parasite effectiveness.
EWest; BEHAVIOR, PARASITES

545 Kotenko, A.G. 1975.
The effect of *Meteorus pulchricornis* Wesm. (Hymenoptera, Braconidae) on changes in weight and mobility of parasitized gypsy moth larvae, *Ocneria dispar* L. (Lepidoptera). In: II Vsesoyuznaya konferentsiya molodykh uchenykh po voprosam sravnitel'noy morphologii i ekologii zhivotnykh. Tezisy dokladov. AN SSSR, Moscow: 20-21.
-- The development of larvae was studied from the moment they were parasitized until their death. Development of *Meteorus* from larviposition to pupation lasts 13 to 18 days. Parasitized larvae grow and molt but they gain weight slower than healthy ones. Percentage of weight loss to maximum weight on the day of parasite emergence averages 33.8%. Larvae become immobile 2 to 4 days before parasite emergence. After parasite emergence larval motor function is disrupted and death occurs on the first to third day.
EWest; DEVELOPMENT, PARASITES

546 Kotenko, A.G. 1976.
Secondary parasites of the gypsy moth, *Ocneria dispar* L., in outbreak areas in the Lower Pridneprovye. Vestnik zoologii. (1):80-82.
-- Sixteen species of secondary parasites of the gypsy moth belonging to 7 families of Hymenoptera are listed. Thirteen of them are mentioned, for the first time, in relation to the region under study. The most active were: *Eurytoma verticillata* (Fabr.), *E. goidanichi* (Bck.), *Dibrachys cavus* (Walk.), and *Pediobius* sp. on *Apanteles* sp., and *E. vericillata* (Fabr.), *Hemiteles areator* (Grav.), and *Brachymeria secundaria* (Rusch.) on *Meteorus* sp.
EWest; PARASITES

547 Kotenko, A.G. 1976.
The braconid wasps (Hymenoptera, Braconidae)--entomophages of the gypsy moth, *Ocneria dispar* L., in the southern Ukraine. Entomologicheskoye obozrenie. 55(1):151-158.
-- Braconids of 7 species were reared from the gypsy moth. Four species not earlier recorded as parasites of the gypsy moth in the southern Ukraine are *Apanteles ocneria*, *A. liparidis*, *Meteorus gyrator*, and *M. versicolor*. *A. porthetriae* and *A. solitarius* are the most widespread due to windblown dispersal of parasitized first instars. A descriptive table of these parasites is given, and some data on their biology are presented. The significant effect of hyperparasites on parasite numbers is discussed.
EWest; PARASITES

548 Kotenko, A.G. 1977.
Entomophages of the gypsy moth, *Ocneria dispar* L., in Southern Ukraine and their role in regulating pest density. Avtoreferat dissertatsii kandidata biologicheskykh nauk. Kiev. 24 p.
-- A significant supplement is made to the list of entomophages of the gypsy moth in the southern Ukraine (56 species vs 30 previously known), with data on areas of many species increased. Parasite species that belong to the family Braconidae, which have been mentioned in earlier literature but diagnosed incorrectly, are now exactly established. New data on ecology of parasites and predators of the gypsy moth are given. Trophic relations in the entomophage complex are presented schematically, and factors influencing the number and effectiveness of some species are detected. The relative role of parasites and predators in the destruction of gypsy moth is estimated and the most important entomophages regulating pest populations are identified. On the basis of these investigations, measures to maintain and increase the effect of entomophages are suggested.
EWest; BIOLOGICAL CONTROL, PARASITES, POPULATION DYNAMICS, PREDATORS

549 Kotenko, A.G. 1978.
Tachinid flies (Diptera, Tachinidae) - entomophages of gypsy moth at the Black Sea State Preserve. In: 50 let Chemomorskomu zapovedniku. Materialy respublikanskogo seminara-soveshchaniya. Kiev: 70-72.
-- Ten tachinid species are mentioned. *Parasetigena agilis* R.-D., *Drino inconspicua* Mg., and *Exorista larvarum* L. were recorded previously, while *Zenilla libatrix* Panz., *Exorista fasciata* Fll., *Blepharipoda scutellata* Mg., *Blondelia nigripes* Fll., and *Compsilura concinnata* Mg. are recorded in the Black Sea Preserve for the first time. *Exorista rossica* Mesn,. and *Microphthalma europaea* Egg. are recorded in the Ukraine for the first time. The most effective tachinids are *E. rossica, P. agilis, E. larvarum, B. scutellata*, and *E. fasciata*. Parasitic flies are most effective at the outbreak and collapse phases.
EWest; PARASITES

550 Kotenko, A.G. 1981.
Vertical migrations of gypsy moth larvae, *Ocneria dispar* L., and their impact on phytophage activity in Southern Ukraine. In: Ekologo-morphologichekiye osobennosti zhivotnykh i sreda ikh obitaniya. Naukova Dumka, Kiev: 102-104.
-- Daily vertical migrations of larvae result in increased proportion of parasitized gypsy moth larvae in the crown during the day; parasitized insects are less mobile. This phenomenon makes parasite competition more acute. As insectivorous birds are also active during the day, their activity can lead to some sanitation of the pest population. Because the percentage of molting larvae in the crowns in the daytime is higher, the effectiveness of tachinids declines as they oviposit on host covering. Parasite eggs are shed together with the larval covering before hatch. As a result of the vertical migrations of larvae, some part of ichneumonid cocoons and tachinid puparia get into tree hollows and artificial bird nests where cocoons are destroyed by dermestids and puparia go dry. This also effects the parasite population.
EWest; BEHAVIOR, DISTRIBUTION, LARVAE, PARASITES

551 Kotenko, A.G. 1981.
Vertical migrations of larvae of the gypsy moth (*Ocneria dispar* L.) and their effect on activity of natural enemies in southern Ukraine. In: Ekologo-morfologicheskiye osobennosti zhivotnykh i sreda ikh obitaniya. Naukova Dumka, Kiev: 102-114.
-- In the daytime, gypsy moth larvae migrate vertically to shelters. Parasites of the gypsy moth also were studied.
EWest; BEHAVIOR, DISPERSAL, LARVAE, PARASITES

552 Kotenko, A.G. 1981.
The effect of some behavioral responses of the gypsy moth, *Ocneria dispar* L. larvae on entomophages. In: Povedeniye nasekomykh kak osnova dlya razrabotki mer bor`by s vreditelyami sel`skogo i lesnogo khozyaystva. Minsk: 125-128.
-- The effect of some behavioral traits of gypsy moth larvae on the activity of primary parasites and predators was studied. These include wind dispersal, vertical daily migrations, selection of pupation sites by the larvae, and response of larvae to parasite attack. In southern Ukraine, 58 entomophage species of the gypsy moth are registered; of them, 21 species are primary parasites and predators of larvae. Investigation of numbers, species composition and behavioral traits of entomophages and the host shows that behavioral traits of gypsy moth larvae affect both the character of the pest (natural enemy relations) and peculiarities of relations within the entomophage complex.
EWest; BEHAVIOR, LARVAE, PARASITES, PREDATORS

553 Kotenko, A.G. 1982.
Dermestid beetles (Coleoptera, Dermestidae) - gypsy moth entomophages in Southern Ukraine. Report I. Species composition and ecology. Vestnik zoologii. (1):41-45.
-- Six species of dermestids, entomophages of the gypsy moth, are recorded in southern Ukraine. These were *Dermestes lardarius* L., *D. undulatus* Brahm., *D. erichsoni* Gang., *D. bicolor* F., *Anthrenus verbasci* (L.), and *Trododerma* sp. Of greatest importance are species of the genus *Dermestes*, which destroy gypsy moth egg masses. Ecology of some dermestid species is presented.
EWest; BIRDS, EGGS, PREDATORS

554 Kotenko, A.G. 1983.
Competition among primary insect parasites of gypsy moth larvae. In: II Vsesoyuzny s"yezd parasitotsenologov. Tezisy dokladov. Kiev: 169-170.
-- Investigations of competition among entomophages, primary parasites of the gypsy moth in southern Ukraine, show that the ichneumonid complex dominating in the early and middle instars tends to give way to the tachinid complex in the second half of larval development. Among parasites of early instars, braconids of the genus *Apanteles* prevailed. Ichneumonids dominated in destruction of middle instars, when the host population was low; tachinids dominated when it was high. Competition among parasites grows more acute due to larval migrations (with wind and daily vertical migration), and some economic measures, such as egg mass treatment with petroleum and mowing of grass cover. Differences in parasite ecology contribute to the decrease in competition, composition of additional hosts and enemies, adjustment to different instars of the host, etc.
EWest; PARASITES, POPULATION DYNAMICS

555 Kovalev, B.G., Bednyy, V.G., Carde, R. 1980.
Attraction of disparlure enantiomers for the gypsy moth and the nun moth. In: Khemoretseptsiya nasekomykh. Vilnius: 106-112.
-- Field tests of optically active enantiomers of disparlure showed / + /-cis-disparlure to be much more attractive to gypsy moth males than cis-disparlure and the racemic mixture of these isomers. / - /-disparlure does not produce an inhibitory effect on nun moth males. The possible role of optical isomerism of disparlure in genetic isolation of these species is suggested. Literature on this question is reviewed.
EWest, EEast; PHEROMONES

556 Kovalevskaya, N.I., Gninenko, Yu.I. 1984.
Polymorphism of hydrolytic ferments in gypsy moth populations in terms of the problems of density dynamics and biological control. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 226-227.
-- Electrophoresis in polyacrylamide gel was used to detect polymorphism of leucinaminopeptidase and esterases in gypsy moth eggs from natural populations in North Kazakstan. Three types of carboxylesterase and 47 types of leucinaminopeptidase were distinguished. The data are evidence for the adaptive nature of polymorphism of hydrolases in gypsy moth populations. The results obtained suggest that polymorphism of pest egg hydrolases can be used to forecast pest numbers and to estimate the effect of different means of control.
WSiberia, MAsia; EGGS, ENZYMES, GENETICS, PROGNOSIS

557 Kovalskiy, A.A., Ketsenogy, K.P., Sakharov, V.M., Makarov, V.I. 1982.
Optimatization of insecticide application. In: Aerozoli v zashchite rasteniy. Moscow: 96-105.
-- The correlation between insecticidal aerosol size and the amount of insecticide received by gnats and first instars of gypsy moth is discussed. If the size is 10 to 20 mm the amount of insecticide received by the insect is the highest and the preparation expenditure is the lowest.
WSiberia; CHEMICAL INSECTICIDES

558 Kovalskiy, A.A., Kutsenogiy, K.P. 1977.
Determination of the principles of insecticidal aerosol action on insects. In: Fundamental'nyye issledovaniya: khimicheskiye nauki. Nauka, Novosibirsk: 56-61.
WSiberia; CHEMICAL INSECTICIDES

559 Kovalskiy. A.A., Kutsenogy, K.P., Chankina, O.V., Zagulyaev, G.N., Kirov, Ye.I., Makarov, V.I., Sakharov, V.M. 1979.
Kinetics of pesticide accumulation in insects when treated with aerosol insecticide. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya khimicheskikh nauk. (5):82-176.
WSiberia; CHEMICAL INSECTICIDES, PHYSIOLOGY

560 Kovalsky, A.A., Kutsenogiy, K.P., Chankina, O.V., Zagulyaev, G.N., Makarov, V.I., Sakharov, V.M., Kirov, Ye.I. 1978.
Effect of particle size on efficacy of insecticidal aerosols. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya khimicheskikh nauk. (7):131-137.
-- The relationship between particle size and efficiency of application of aerosol insecticide was studied. A procedure for the application of highly concentrated preparations containing more than 20% of pesticide is described. The most effective is the cloud with particles of 5 to 10 mm in diameter.
WSiberia; CHEMICAL INSECTICIDES

561 Kozhanchikov, I.V. 1940.
The importance of environmental conditions on gypsy moth egg development. Vestnik zashchity rasteniy. (3):3-16.
ECentral; EGGS

562 Kozhanchikov, I.V. 1949.
The importance of seasonal changes in food plant leaves for the gypsy moth, *Ocneria dispar* L., development. Doklady Akademii nauk SSSR. 66(4):1203-1206.
-- In three sets of experiments (spring, summer, autumn) gypsy moth larvae were fed on willow, oak and mountain ash from hatch to pupation. The following parameters were estimated: survival, length of development of every stage, larval weight in every instar, pupal weight, and imago fecundity. Feeding on spring leaves by all the species proved to be the most favorable. Feeding on summer and autumn leaves of willow and oak increases mortality or leads to 100% mortality at the beginning of development. The fact that normal growth of the species of spring phenology is impossible when feeding on summer leaves is one of the most important reasons for their specialization and, therefore, a cause for obligatory diapause.
ECentral; HOST PLANTS, PHENOLOGY, REARING

563 Kozhanchikov, I.V. 1950.
Gypsy moth. In: Fauna SSSR. Nasekomye cheshuekrylyye. Volnyanki Orgyidae. Izd.AN SSSR, Moscow and Leningrad: 582.
-- A global review of the taxonomy and biology of Palearctic Lymantriidae. At pages 365-374 author gives synonyms of the species and a list of principal works published before 1950. There is a description of imago morphology including male and female genitals, larvae with their chetotaxis, eggs and pupae. Color variations and their possible causes are briefly described. The author defines the species area in Eurasia, gives a list of food plants containing 155 plant species of 29 families, periods of development, fecundity, habitats and damage zones. A list of parasites and predators is also included (by Shedl, 1936).
COLOR POLYMORPHISM, HOST PLANTS, MORPHOLOGY, PARASITES, PREDATORS, REVIEW, TAXONOMY

564 Kozhanchikov, I.V. 1950.
Patterns of hibernation and diapause in the gypsy moth, *Ocneria dispar* L. Doklady Akademii nauk SSSR. 73(3):605-607.
-- The gypsy moth always overwinters at the egg stage in diapause. Larvae sometimes hatch in the same year, but they die because of the absence of suitable food (spring leaves). In general, the gypsy moth has egg diapause of one hibernation. Egg hatch can occur at temperatures ranging from + 13° C to 35-40° C. It is concluded that only tropical conditions are unfavorable for the diapause of this species. The maximum life span of gypsy moth embryos is about 14 months.
ECentral; DIAPAUSE, EGG HATCH, TEMPERATURE

565 Kozhanchikov, I.V. 1952.
Optimum temperature for development. IX. Temperature amplitude as a factor for development of

the gypsy moth and other silkworms.
Entomologicheskoye obozrenie. 32:27-42.
-- Comparative adaptability of the gypsy moth and the processionary moth to different temperatures was studied. Adaptability of these species to temperature variations is different: the processionary moth can develop at a temperature range of 10° C-20° C; the gypsy moth can develop at a temperature range of 18° C-20° C. With increase in daily amplitude, the length of development and larval mortality increase while larval weight decreases; pupal viability and adult fecundity also fall. A conclusion is made that the different response to temperature conditions is related to different ecological plasticity of the species under study.
ECentral; TEMPERATURE

566 Kozhanchikov, I.V. 1955.
***Ocneria dispar* L. (*Lymantria dispar* L.) - the gypsy moth.** In: Vrediteli lesa. Spravochnik. Izd. AN SSSR, Moscow: 243.
-- A short ecological description of the species, major and minor food plants and the area of occurrence are given in a one page description.
EWest, EEast, ECentral, Caucasus, MAsia, ESiberia, Far East; GENERAL BIOLOGY

567 Kozlov, E.A., Levitina, T.L., Gusak, N.M., Larionov, G.V., Veremeichenko, S.N., Serebryanyy, S.B. 1978.
Comparative biochemical studies of polyhedral proteins of nuclear polyhedrosis viruses. Biokhimiya. 43(12):2189-2195.
-- The method of disc-electrophoresis in polyacrylamid gel showed polyhedral proteins of nuclear polyhedrosis viruses (NPV) of *Bombyx mori*, *Galleria mellonella* and *Porthetria dispar* to have a molecular weight of 28.000 + - 300. Polyhedra of the silkworm and the gypsy moth contain protease which, at some points specifically disintegrated the polypeptide chain of polyhedral protein which in solution has pH = 10.5. Amino acid composition of polyhedral proteins of NPV is similar for the silkworm and the gypsy moth, suggesting structural homology of proteins.
ECentral; BIOCHEMISTRY, VIRUS

568 Kozlov, E.A., Levitina, T.L., Gusak, N.M., Ovander, M.N., Serebryanyy, S.B. 1981.
Comparison of the amino-acid sequences of inclusion body proteins from the nuclear polyhedrosis viruses of *Bombyx mori*, *Porthetria dispar*, and *Galleria mellonella*. Bioorganicheskaya khimiya. (7):1008-1015.
ECentral; BIOCHEMISTRY, VIRUS

569 Kozlov, M.A. 1971.
Proctotrupoid parasites (Hymenoptera, Proctotrupoidea) of fauna of the USSR. In: Trudy Vsesoyuznogo entomologicheskogo obshchestva, vypusk 54. Parasiticheskiye nasekomyye - entomophagi. USSR Academy of Science, Leningrad: 3-67.
-- *Eremioscelio lymantriae* Masner and *E. dichropterus* Kozlov are among the parasites of gypsy moth listed.
MAsia; PARASITES, REVIEW, TAXONOMY

570 Kozlov, M.A., Kononova, S.V. 1983.
Telenomids of fauna of the USSR. (Telenomidy fauny SSSR.) Nauka, Leningrad. 336 p.
-- *Telenomus lymantriae* Kozlov is listed as a gypsy moth parasite.
MAsia; PARASITES, REVIEW

571 Kravtsov, B.G., Baranchikov, Yu.N., Kondrina, G.S., Voloshchenko, I.D., Antonova, N.N. 1980.
Ecological cause of morphological patterns of gypsy moth wings. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoysuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 124.
-- Gypsy moth adults From natural populations in the region near the Urals, South Urals, Tuva, and the east Baikal region, were reared under laboratory conditions. The length of veins of the right forewing and values of the angle produced by distal veins were examined. Adults of both sexes in all populations under study were morphologically similar. This similarity can be accounted for by equality of ecological conditions under which the pest preimaginal stages developed. It is shown that ecological factors should be taken into account when intraspecies groups are identified in the area according to their morphological parameters.
EEast, WSiberia, EWest; GEOGRAPHIC VARIATION, MORPHOMETRICS

572 Kriventsov, Yu.I. 1968.
Ecological and physiological peculiarties in development rhythm and behavior of insects. In: Trudy XIII Mezhdunarodnogo entomologicheskogo kongressa. Nauka, Moscow: 404-405.
-- The periodic activity of the processionary moth, the gypsy moth and the walking stick, *Carausius morosus,* were studied. Life cycles of each insect species are regulated by daily and seasonal variations in temperature and lighting, but in some cases effect of unfavorable conditions can change the rhythm. For instance, when eggs of lepidopterans were kept at different photoperiods, illuminated with the light of different spectra, and gypsy moth egg were kept in water for a period of up to 300 days, behavior and rhythm changed.
ECentral; EGGS, PHENOLOGY, PHOTOPERIOD

573 Kriventsov, Yu.I. 1970.
Vitality of gypsy moth eggs (*Porthetria dispar* L.) and the silkworm (*Bombyx mori* L.) under anaerobic conditions. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USKhA, Kiev: 31-35.
-- Experiments in which gypsy moth eggs were kept in water for a period of up to 300 days, and silkworm eggs for up to 350 days, demonstrated the great ability of eggs of lepidopterans to tolerate anaerobic conditions. If kept in water for a long time gypsy moth eggs had higher viability (70%). Sensitivity of silkworm eggs to anaerobic conditions was determined by the time which passed from the day of oviposition to the day when eggs were placed into water. The maximum survival was recorded when 5-day-old eggs were put into water.
EWest; EGGS, PHYSIOLOGY

574 Kriventsov, Yu.I. 1970.
Age-dependent resistance of gypsy moth larvae (*Porthetria dispar* L.) to white muscardine fungus (*Beauveria bassiana* (Bals.) Vuill.). In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USKhA, Kiev: 22-26.
-- Gypsy moth larval resistance to beauverin increases with their growth. Survival of first instars infected with 1% beauverin is 18.2%; 5% beauverin causes 100% mortality and sensitivity of second instars is lower. If larvae are infected in the third instar and do not die, the results of the application manifest themselves in the following ontogeny stages: pupa, adult, eggs. Fecundity decline was highest when instars I, II and IV were infected with beauverin. These data should be taken into account when considering integrated pest control.
EWest; BIOASSAY, FUNGI

575 Kriventsov, Yu.I. 1972.
Ecological and physiological patterns of individual development of lepidopterans. In: Naukovi pratsi USGA. Zakhist roslin vid shkidnikiv ta khvorob sel'skogospodarskikh kul'tur. USGA, Kiev: 94-96.
-- Ecological and physiological peculiarities of lepidopterous insect development were studied to establish the effect of light, temperature, and food on manifestation of biological rhythm of development and behavior of insects belonging to 7 model species, including the gypsy moth. Temperature, lighting conditions, food qualitative composition, and environmental conditions changed within 24 hours and within a season. At the onset of ontogeny and at the pupal stage, the temperature appeared to be the most important factor, determining intensity of development of lepidopterous insects. For late instars at the optimum temperature, feeding conditions and food quality are the dominant factors.
EWest; DEVELOPMENT, FOLIAGE QUALITY, TEMPERATURE

576 Kriventsov, Yu.I., Opanasjuk, T.I. 1971.
The effect of entobacterin and beauverin mixtures on some lepidopterous pests of fruit trees. In: Biologicheskaya zashchita plodovykh i ovoshchnykh kul'tur. Kishinev: 163-164.
-- Microbiological preparations of entobacterin-3 and beauverin were tested for use in control of some lepidopterous orchard pests (the apple moth, the gypsy moth, the tent caterpillar). It was discovered that the application of mixed entomopathogens or entomopathogens together with substances that increase the effect of microbiopreparations, e.g., with small doses of pesticides or substances, makes the medium favorable for increasing biopreparation pathogenicity. Application of these preparations in combination with other protective measures would contribute to successful development of integrated plant protection.
EWest; BACTERIA, FUNGI, MICROBIAL PESTICIDES, PEST LIST

577 Kriventsov, Yu.I., Pokhiton, S.V., Kaduk, M.A. 1968.
The effect of infections on the hemolymph of gypsy moth and the tent caterpillar. Visnyk sil'skohospodarskoy nauki. (9):79-82.
-- Changes in the hemolymph of the gypsy moth and the tent caterpillar infected with polyhedrosis of the processionary moth, beauverin and a mixture of beauverin and viruses showed that mixed infections affected the insects more than separate preparations. Under the impact of a polyhedrosis virus, beauverin and their mixture, the ratio of hemolymph forming elements changed. The authors established that enocytes and eosinophyls underwent morphological changes under the impact of infection. A conclusion can be made that these forming elements take part in the control of infection. It is suggested that these changes should be taken into consideration when diagnosing the condition of the infected organism.
EWest; FUNGI, HEMOLYMPH, VIRUS

578 Krulikovskiy, L.K. 1906.
Data on lepidopterous species in the Bessarabia region. Russkoe entomologicheskoe obozreniye. 6:184-187.
-- A list of 59 lepidopterous species is given, including the gypsy moth.
EWest; FLIGHT, PEST LIST

579 Krulikovskiy, L.K. 1906.
Notes on the collection of lepidopterous insects in the Urzhum area of the Vyatsk region in the Summer of 1905. Russkoe entomologicheskoe obozreniye. 6:60-63.
-- In collections of lepidopterous insects of the Vyatka Province, the gypsy moth is registered as a non-outbreak species.
ECentral; OUTBREAKS, PEST LIST

580 Krulikovskiy, L.K. 1909.
Notes on the collection of lepidopterans in the Vyatka region in Summer of 1908. Russkoe entomologicheskoe obozreniye. 8-9:240-244.
-- In collections of lepidopterous insects the gypsy moth is registered as a common species for the region.
ECentral; PEST LIST

581 Krykova, Ye.A. 1976.
Insect pests and vascular mycosis of oak trees. Zashchita rasteniy. (5):42-43.
-- Insect pests of oak play an active part in the transfer of pathogens of vascular mycosis of oak. Both dendrophages and phyllophages, including the gypsy moth, can be carriers. Flight and feeding of pests occur in the period of high susceptibility of oak to the disease (May - June), when the pathogenic fungus is at the most aggressive stage. Hence, effective control of phytophagous carriers is important for effective disease control. Bacterial preparations are suggested for phyllophage control.
EWest; FUNGI, PEST LIST, TREE HEALTH

582 Kryshtal', A.F. 1959.
Insects - agricultural pests of the Forest Steppe and Polesye of the Ukraine. (Komahi-shkidniki cil'ckogo spodarskikch roslin v umovakh Lisostepu ta Polissia Ukraini.) KGU, Kiev. 369 p.

-- The gypsy moth is regarded as a widespread primary polyphagous pest of orchards. It is listed among pests of bean species, Rosaceae, mulberry tree, English walnut, nut tree, currant, gooseberry, and barberry.
EWest; HOST PLANTS, PEST LIST

583 Kucherov, S.Ye. 1990.
The effect of gypsy moth on the radial increment of the English oak. Lesovedenie. (2):20-29.
-- Effect of late autumn frosts, summer droughts and gypsy moth outbreaks on the radial growth of the English oak in the southern Urals were studied. A procedure for reconstructing the stress of these factors is suggested.
WSiberia; TREE GROWTH

584 Kulagin, N.M. 1896.
Gypsy moth: an outline of life pattern and important control measures. (Neparnyy shelkopryad. Kratkoye opisaniye obraza zhizni i glavneyshikh mer bor'by s etim nasekomym.) Izdanie Moskovskogo muzeya prikladnykh znanii, Moscow. 41 p.
-- Data on pest ecology are given and every life stage is described. Damage is estimated and control measures are discussed, primarily destruction of egg masses.
CONTROL, ECOLOGY, LIFE STAGE DESCRIPTIONS

585 Kulagin, N.M. 1909.
The gypsy moth (*Lymantria dispar* L.). In: Nasekomyye, vrednye dlya sada i ogoroda v sredney i severnoy Rossii. St. Petersburg: 75-80.
-- Gypsy moth life stages and ecology are described. The area is described briefly, damage is estimated and control measures such as treatment of egg masses with petroleum, and sticky belts on tree trunks are discussed.
ECentral; CONTROL, GENERAL BIOLOGY

586 Kulagin, N.M. 1913.
The gypsy moth, *Lymantria* (*Ocneria*) *dispar* L. In: Vrednyye nasekomyye i mery bor'by s nimi. Moscow: 517-538.
-- Gypsy moth adults and larvae are described and data on distribution and outbreaks, primarily in the territory of the European part of Russia from 1880 to 1913, are given. Also discussed are data on gypsy moth phenology in some parts of the region, some peculiarities of species biology, damage, and control measures.
EWest, ECentral; DISTRIBUTION, GENERAL BIOLOGY, OUTBREAKS

587 Kulagin, N.M. 1930.
The gypsy moth. In: Vrednyye nasekomyye i mery bor'by s nimi. Gosizdat, Moscow and Leningrad: 118-126.
-- Data on the gypsy moth are given: life stages and ecology are described, the area is characterized briefly, and principal control measures are discussed.
ECentral; CONTROL, GENERAL BIOLOGY

588 Kupriyanova, V.A. 1968.
Prospects of attractant application against forest insect pests. In: Zashchita lesa ot vrediteley i bolezney. Moscow: 131-139.
-- Domestic and foreign literature on sex attractants of the gypsy moth, the pine moth, the nun moth, and the pine noctuid are reviewed. As attractants, the researcher uses extracts of the female genital glands, hydrogenated extracts, synthetic sex attractants, and their analogues and isomers. Application of attractants seems promising, allowing early detection of pests and their foci so that control measures could be taken. Joint application of attractants and insecticides reduces the expenditure of the latter and prevents treating the entire stand.
ECentral; PEST LIST, PHEROMONES, REVIEW

589 Kupriyanova, V.A. 1969.
Prospects of attractant applications against the gypsy moth and other forest pests. Zashchita rasteniy. (11):39-41.
-- Data on application of attractants include catching males with unfertilized females of different lepidopterous species, and a history of introducing disparlure into the practice of gypsy moth control all over the world are reviewed. Experiments were made on attractants produced by benzine extraction of genital glands of unfertilized females.
ECentral; PHEROMONES, REVIEW

590 Kupriyanova, V.A. 1973.
The effect of insecticides on changes in insect infection by pathogenic microorganisms. In: Zashchita lesa ot vrediteley i bolezney. Sbornik trudov. Moscow: 28-39.
-- The effect of large-scale treatments of stands with insecticides on the rate of gypsy moth and green oak leaf roller infection with entomopathogenic organisms was studied. Treatments did not affect gypsy moth total mortality caused by diseases. Application of organic chlorine preparations produced a negative effect in both species on the rate of infection with entomopathogenic organisms, resulting in population sanitation. Chlorophos had no effect on the rate of larval infection with entomopathogens. It is concluded that chlorophos should be used for pest control in the foci.
ECentral; CHEMICAL INSECTICIDES, PATHOGENS

591 Kupriyanova, V.A. 1981.
The joint effect of diseases and parasites on gypsy moth survival. In: Nadzor za vreditelyami i boleznyami lesa i soversheństvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 107-109.
-- The joint effect of diseases and parasites on gypsy moth survival was studied in oak groves in the Saratov Province in 1976, 1979, and 1980, in different periods of the yearly cycle, with changing density of pest population. By studying species composition, different infectious and invasion diseases were identified; their pathogens were a nuclear polyhedrosis virus, microsporidia, and the fungi, *Penicillum brevicaulis* and *Beauveria bassiana*. A portion of the insects usually died of non-specific diseases without contribution by microorganisms. Survival of first and second instars was found to correlate with egg sizes. The majority of larvae and pupae died of parasitism (up to 90%); 1.5-15% of larvae and some pupae died of diseases. The lower the percentage of parasitism, the higher the mortality caused by diseases.
ECentral; EGGS, FUNGI, MICROSPORIDIA, PARASITES, VIRUS

592 Kupyanskaya, A.I. 1967.
Insect pests in the "green zones" in the cities of Vladivostok and Artyom. In: Itogi izucheniya lesov Dal'nego Vostoka. Vladivostok: 259-262.
-- The gypsy moth is mentioned as one of important pests of Rosaceae and oak in the forests near Vladivostok and Artyom. It is an outbreak species. Pesticides are suggested as a means of control.
Far East; CHEMICAL INSECTICIDES, HOST PLANTS, PEST LIST

593 Kurentsov, A.I. 1939.
Macrolepidoptera - pests of trees and shrubs in Ussuriisk Territory. In: Trudy Dal'nevostochnoy gornotayezhnoy stantsii AN SSSR. Moscow: 107-210.
Far East; HOST PLANTS, PEST LIST

594 Kurentsov, A.I. 1941.
Problems of agricultural development of territories covered with mountainous taiga in Primorye regions and insect pests. In: Trudy Dal'nevostochnoy gornotayezhnoy stantsii AN SSSR. Moskva: 1-108.
-- Gypsy moth outbreaks are recorded in Primorye. In natural conditions the pest seems to prefer Rosaceae and oak. Conditions of species migrations, the gypsy moth included, from natural biocenoses to artificial stands are considered.
Far East; DISTRIBUTION, HOST PLANTS, PEST LIST

595 Kuteev, F.S. 1958.
The effect of insect pests on shrinking oak groves in the North Caucasus. In: Sbornik rabot po lesnomy khozyaystvu Severnogo Kavkaza. Maikop: 152-170.
Caucasus; PEST LIST, STAND CONDITION

596 Kuteev, F.S., Lyashenko, L.I., Zurabova, E.R., Chekanov, M.I. 1983.
Lepidocide concentrate application against forest pests. Lesnoye khozyaystvo. (8):52-53.
-- Entobacterin has low efficacy in gypsy moth control. In Moldavia, in 1982, lepidocide was applied against the gypsy moth and its efficiency was 99.92%.
EWest; BACTERIA, MICROBIAL PESTICIDES

597 Kuteev, F.S., Zubkova, T.I., Pribylova, M.V. 1980.
The condition of oak groves and measures of their protection against insect pests. In: Zashchita lesa ot vrediteley i bolezney. Moscow: 3-11.
ECentral; CONTROL, TREE HEALTH

598 Kuteev, F.S., Zubov, P.A., Dashevsky, V.I. 1980.
Efficiency of ultra-low volume spraying. Zashchita rasteniy. (6):31-32.
-- Tests were made in different age stands in Vologda, Saratov, Rostov, and Voronezh Provinces, and Krasnodar Krai. Ricefan, carbophos, dursban, zolon, volaton, actellic, sumition, and decis were applied. Ultra-low volume aerial spraying is more effective than treatment with emulsifying concentrations, and technical and moistened powders.
ECentral; AERIAL SPRAYING, CHEMICAL INSECTICIDES, STAND COMPOSITION

599 Kutsenogiy, K.P., Ankilov, A.N. 1981.
Theoretical backgrounds for optimizing use of insecticidal aerosols against gypsy moth larvae. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 111-112.
-- A mathematical model for quantitative estimation of the effect of insecticide aerosol application in pest control is suggested. Experiments show that the main way gypsy moth larvae receive lethal doses is by the deposition of drops containing pesticide from airborne preparations. For any distance, there is a drop diameter at which the pesticide will be the lowest, all other factors being equal. Dependence of the size of the drops of the optimum capture on the width of capture, weather conditions, and larval instar is calculated.
WSiberia; AERIAL APPLICATION, CHEMICAL INSECTICIDES, MODELS

600 Kutsenogiy, K.P., Chankin, O.V., Kirov, E.I., Makarov, V.I., Sakharov, V.M. 1984.
The effectiveness of the accumulation rate of the gamma-isomer of HCH on the III-IV instar gypsy moth larvae during application of aerosol insecticides. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. (6):62-68.
WSiberia; CHEMICAL INSECTICIDES

601 Kutsenogy, K.P., Chankin, O.V., Zagulyaev, G.N., Makarov, V.I., Sakharov, V.M., Kirov, E.I. 1982.
The effect of size, concentration, and speed of aerosol particles, and fallout density on preparation amounts affecting gypsy moth larvae. In: Aerozoli v zashchite rasteniy. Moscow: 88-96.
-- Deposition of monodispersed insecticide aerosols of a diameter of 8.28 and 57 mm at a stream velocity ranging from 0.5 to 3 m/sec. and concentrations of 2×10^2 to 3 mkgl on gypsy moth larvae was investigated. The rate of pesticide accumulation on insects and effectiveness of capture cross-section were estimated. Effectiveness of deposition was shown to depend on the size and velocity of particles. A comparison is made of the accumulation rate of pesticides depositing from the volume with the collection rate on contact with deposits of different density created by the particles of equal size. This comparison showed that the bulk of the preparation was deposited on the insect from aerosol clouds.
WSiberia; AERIAL APPLICATION, CHEMICAL INSECTICIDES

602 Kuznetsov, N.Ya. 1904.
A gynandromorph specimen of *Porthetria dispar* L. (Lepidoptera, Lymantriidae). Russkoe entomologicheskoe obozreniye. 6(1):203-206.
-- In June 1903, in the vicinity of Alushta, a gynandromorphic gypsy moth "male" was found. It had the regularly distributed secondary sexual characters of a female, female-type pigmentation and scales on some parts of each of the four wings, and abdominal hairs typical of females.
EWest; GENETICS, MORPHOLOGY

603 Kuznetsov, N.Ya. 1936.
Lepidopterans. In: Zhivotnyy mir SSSR. Izd. AN SSSR, Moscow and Leningrad: 416-429.
-- This is an outline of lepidopterous fauna. The gypsy moth is mentioned among important pests of orchards and forests.
PEST LIST

604 Kuznetsov, V.I. 1960.
Materials on fauna and ecology of lepidopterans (Lepidioptera) of the western Kopet-Dag. In: Trudy zoologicheskogo instituta AN SSS. Fauna i ekologiya nasekomykh Turkmenskoy SSR. Leningrad: 11-93.
-- The gypsy moth is not found in irrigated and mountain-desert zones. In the lower forest subzone larvae are common on forest species and English walnut, although there are no outbreaks and do not cause significant damage. In the upper forest subzone, pest outbreaks occur and the gypsy moth defoliates hardwood species. An outbreak is recorded in 1952; in 1953 the population decreased due to entomophage activity. Gypsy moth phenology in Turkmenistan is also presented.
MAsia; DISTRIBUTION, HOST PLANTS, PHENOLOGY

605 Kuznetsov, V.I., Martynova, Ye.F. 1954.
A list of lepidopterans for the middle region of the Ural River Basin. In: Trudy zoologicheskogo instituta AN SSSR. Leningrad: 322-350.
-- The gypsy moth is found in the floodplain and ravine forests of the Ural River. In 1950, in some flood plain regions pest outbreak were recorded. Larvae and egg masses were found on all tree shrub species, but oak-linden forests were the most heavily attacked. Species phenology in the region under survey is also presented.
EEast; PHENOLOGY, STAND COMPOSITION

606 Kuznetsova, L.V., Kaloshin, B.K. 1984.
Populational analysis of esterase and acid phosphatase of the gypsy moth. In: Biokhimiya nasekomykh. MGPI, Moscow: 75-81.
ECentral; BIOCHEMISTRY, ENZYMES

607 Kuznetsova, Ye.I., Neupokoeva, N.K. 1980.
Protection of tree and shrub species. Zashchita rasteniy. (1):36.
-- In Rostov Province, seedlings of linden and sweetbrier are injured. Dendrobacillin with chlorophos is applied against phyllophagous pests.
ECentral; BACTERIA, CHEMICAL INSECTICIDES, MICROBIAL PESTICIDES, PEST LIST

608 Kvartskhelia, T. 1914.
Development of fruit trees and pest invasions. Plodovodstvo. (3):186-188.
-- In Moldavia, the spring of 1913 came early and was rapid and steady, but throughout the season populations of various pests were high. The gypsy moth is mentioned among lepidopterans that attacked orchards.
EWest; PEST LIST, WEATHER

609 Lappa, N.V. 1971.
Effect of Beauverin and Entobacterin on pH-value in the hemolymph and the intestine in the gypsy moth and the cabbage moth. In: Patologiya chlenostonogikh i biologicheskiye sredstva borby s vrednymi organizmami. Tezisy dokladov 1 gorodskoy konferentsii. Kiev: 100-103.
-- The effect of *Bacillus thuringiensis* var. *galleriae* and *Beauveria bassiana* on the gypsy moth and cabbage moth was studied. Analysis of pH of gypsy moth hemolymph (instars V and VI) after 8 days did not reveal significant changes, which can be accounted for by the slow action of these preparations on the pest under the given experimental conditions. The intestinal pH of these insects gradually decreased in comparison with the control. A conclusion is made that pH values of the hemolymph and the intestine of the test insects can be used together with other criteria to establish the degree of decrease in viability of these species affected by diseases.
EWest; BACTERIA, FUNGI, HEMOLYMPH, MICROBIAL PESTICIDES

610 Larionov, G.V. 1974.
Serological interrelationship of the strains of a nuclear polyhedrosis virus of *Ocneria dispar* L. from different geographic zones. In: Trudy Biologicheskogo instituta. Virusy nasekomykh. Nauka, Novosibirsk: 53-57.
-- Four strains of a nuclear polyhedrosis virus of the gypsy moth extracted from different regions of the USSR and Yugoslavia were studied. The serological interrelationship was determined by gel precipitation; sera were produced by immunization of rabbits. The antigenic structure of a nuclear polyhedrosis virus of the "amur" strain was somewhat more complex than other strains studied.
EWest, ECentral; GENETICS, HEMOLYMPH, VIRUS

611 Larionov, G.V. 1974.
Morphological characteristic of the nuclear polyhedrosis virus of *Ocneria dispar* L. In: Trudy Biologicheskogo instituta. Virusy nasekomykh. Nauka, Novosibirsk: 12-19.
-- Results of examining body-inclusions of viral bundles and viral rods with an electronic microscope are presented. Particle sizes and some details of their structure are given.
WSiberia; HISTOLOGY, VIRUS

612 Larionov, G.V., Baranovskiy, V.I. 1979.
Effect of virus infection on lytic activity of hemolymph in *Ocneria dispar* L. and *Dendrolimus sibiricus* Tschetv. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. (2):131-135.
-- In the late 1960s, it was found that immunity of insects to most gram-positive bacteria resulted from the presence of a lyzozyme. The authors studied bacteriolytic activity of hemolymph of gypsy moth and Siberian moth larvae during a period of virus disease. Analysis of the data obtained showed that response to the organisms by the larvae infected with a nuclear polyhedrosis virus was analogous to the response to inoculation of bacterial cultures. As a result, bacteriolytic properties of hemolymph were enhanced. Based on different lytic

activity of hemolymph of larvae from different populations, it is suggested that there must be a correlation between the level of bacteriological activity of hemolymph and organism resistance to infection.
WSiberia; BACTERIA, HEMOLYMPH, VIRUS, MICROBIAL PESTICIDES

613 Lazareva, A.I., Ogorodnikova, V.I., Pareva, V.V., Dvortsova, R.A. 1980.
Microbiopreparations in town plantings. Zashchita rasteniy. 8:35-36.
-- Pure bacterial preparations of Bacterin, Dendrobacillin, and Gomelin were mixed with small doses of insecticide and tested against phyllophagous pests. When applied together, doses of bacterial preparations were 3 to 5 times lower and doses of insecticide were 4 to 5 times lower. For better adhesion, aqueous-oil suspension was used. Efficiency of the preparation was calculated by the Abbot formula. Tests were conducted in Bashkiria where Gomelin (2%) proved to be the most effective bacterial preparation for gypsy moth control. Only chlorophos and phosphoamid can be applied; Carbophos inhibits activity of bacterial preparations, even when used in small doses.
EEast; CHEMICAL INSECTICIDES, MICROBIAL PESTICIDES, NUMERICAL DATA

614 Lebedev, A.G. 1935.
Materials on the study of biocenosis in a deciduous forest. In: Zbornik prats' viddilu ekologii nazemnykh tvarin. Kiev: 19-56.
-- The gypsy moth is mentioned as a common species among lepidopterous insects of the forests of Kiev Province. Adults fly from late June to early August.
EWest; PEST LIST

615 Leskova, A.Y. 1968.
Histopathology of some larvae when infected with *Bacillus thuringiensis* var. *galleriae*. In: Biologicheskiye metody bor'by s vreditelyami rasteniy. Riga: 87-92.
-- Pathological changes in the mid-intestine of three insect species, the cabbage white moth, the winter moth, and the gypsy moth were studied. These changes resulted from insects infected with the entomopathogen *B. thuringiensis* var. *galleriae*. Larvae were infected through food sprayed with a suspension of spores the quantity of which ranged from 3 billion to 300,000 per 1 ml. The intestine of gypsy moth larvae continues to function until the death of the insect. Epithelial cells are injured slightly, exfoliating from each other and from the basal membrane. The entomopathogenic bacillus multiplies in the mid-intestine of live larvae and in most cases larvae die of septicemia.
BACTERIA, BIOASSAY, HISTOLOGY, MICROBIAL PESTICIDES

616 Levitina, T.L., Kozlov, E.A., Ovander, M.N., Serebryanyy, S.V. 1981.
Tryptic peptides of the body inclusion proteins of a nuclear polyhedrosis virus of the gypsy moth, *Porthetria dispar*. Bioorganicheskaya khimiya. 7(7):95-985.
BIOCHEMISTRY, VIRUS

617 Levitt, N.N. 1934.
Pupal variability and imago fecundity in the gypsy moth *Porthetria dispar* L. In: Trudy Institutu zoologii ta biologii VUAN. Zbornik prats' viddilu nazemnykh tverin. Tom 2, vyp. 2. Institut zoologii VUAN, Kiev: 135-170.
-- Correlation between gypsy moth imago fecundity and pupal weight and size was studied on insects from two populations: Kiev (eruption phase of gradation) and Crimean (crisis). Pupal weight variation coefficient in the crisis period is larger than at the eruption phase. Practical applicability of these coefficients is discussed.
EWest; FECUNDITY, MODELS, MORPHOMETRICS

618 Likhovidov, V.Ye., Mironik, I.N. 1982.
Organization of forest-pathologic surveillance in the forests of Soviet Moldavia. Lesnoye khozyaystvo. (6):55-57.
-- Surveys were conducted using universally accepted procedures of forest pest inventory.
EWest; MONITORING

619 Likhovidov, V.Ye., Mironik, I.N., Kobelkov, M.Ye., Gubin, A.S. 1981.
Virin-ENSh effectiveness for gypsy moth control in the forests of Moldavia. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 118-120.
-- The preparations tested were dispersed from the ground and from the air. Stands of low density (0.25 egg masses per tree), and of medium density (2.4 egg masses per tree) were sprayed with the preparation from the ground. In low and medium foci populations no decrease in pest number resulted; contrarily, an increase in gypsy moth population was observed both in the control and in the experiment. In the high density foci, pest populations sharply decreased by 94% in the sites treated with Virin-ENSh.
EWest; DENSITY, EGG MASSES, MICROBIAL PESTICIDES, VIRUS

620 Likventov, A.V. 1954.
Effect of food regimen on gypsy moth growth and development. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 64-74.
-- Gypsy moth larvae were fed oak, apple and linden and differences were reflected in larval condition and sex ratio. Feeding on young oak leaves resulted in domination of females, which comprised about 75% of the adults. Linden appeared to be an unfavorable food species as mortality increased significantly. There also were differences in physiological properties of larvae feeding on different species. Higher survival of larvae and 100% survival of pupae was recorded under laboratory conditions in contrast to the natural population.
ECentral; HOST PLANTS, REARING

621 Likventov, A.V. 1955.
Fecundity, egg weight, and progeny survival in the gypsy moth. Zoologicheskiy zhurnal. 34(5):1061-1065.
-- An increase in female fecundity is correlated with lower egg weight. There is a decrease in hatching rate and

survival of insects from lower weight eggs. An inverse relation between the number of deposited eggs and their weight is not always true, as deviations are typical of small females. Counts made for predicting pest outbreaks should be based both on the number of eggs per mass and on egg weight. An outbreak is rare if the weight of an egg ranges from 0.45 to 0.65 mg. A numerical increase of a population occurs when the egg weight is more than 0.8 mg.
ECentral; EGGS, FECUNDITY, NUMERICAL DATA, PROGNOSIS

622 Likventov, A.V. 1957.
Effect of diet change on gypsy moth generations. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 88-98.
-- Gypsy moth population condition is highly affected by larval feeding conditions, a change of food plant with generation in particular. A positive effect is produced if larvae of the first generation feed on unfavored food (linden) and larvae of the second generation feed on favored food (oak). In such situations, survival increases, percentage of females in the entire offspring increases, and the weight of eggs is relatively high. Feeding on unfavored species (linden) in the course of two generations causes further weakening of the population, resulting in a much lower offspring number than in cases when other variants of food change were chosen. Higher egg weight, however, is a sign of high viability of future offspring sufficient to maintain or increase populations.
ECentral; EGGS, HOST PLANTS, REARING

623 Likventov, A.V. 1958.
Experience on gypsy moth control. Vestnik sel'skokhozyaystvennoy nauki. (4):109-110.
-- A gypsy moth outbreak started in Belgorod Province in 1953. During the first stage, egg masses were treated with petroleum; in 1955-1956 this treatment was combined with DDT treatments. It is believed that these measures contributed to the reduction of the pest population while preserving major entomophages. The outbreak was suppressed and by 1957 was eliminated.
ECentral; CHEMICAL INSECTICIDES

624 Likventov, A.V. 1960.
The retarding effect of oak-linden forests on gypsy moth outbreaks. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 33-40.
-- The condition of gypsy moth foci in some forestries of Voronezh, Tula, and Belgorod Provinces was studied. Results of surveys suggest that in mixed stands with a high percentage of linden, the gypsy moth population is in a suppressed state. Therefore, stands where linden comprises not less than 20% can be recommended as shelterbelts as they can control gypsy moth populations. Gypsy moth population suppression in oak-linden stands may result not only from unfavorable feeding conditions but from changes in microclimate; i.e., higher humidity and lower lighting under the tree canopy.
ECentral; HOST PLANTS, STAND COMPOSITION

625 Lindeman, K.E. 1869.
Critique of measures of insect pest control. Russkoe sel'skoe khozyaystvo. (1):304-337.
-- A gypsy moth outbreak was recorded in Saratov Province in 1868; forests and orchards were heavily attacked. Treatment of orchards with arsenic preparations had little effect, and destruction of egg masses by collecting or treating with petroleum is suggested as an effective control measure. The number of entomophages in the foci should be considered before pest control measures are undertaken.
ECentral; CHEMICAL INSECTICIDES, CONTROL, EGG MASSES

626 Lindeman, K.E. 1894.
Gypsy moth from the city of Moscow. Sel'skiy khozyain. 40:832-833.
-- Gypsy moth adults flying in great numbers were observed in Moscow. In many provinces of central Russia, pest outbreaks were recorded from 1890 to 1894. Gypsy moth egg masses are described in detail, and it is suggested that they be destroyed in city parks and gardens by scraping them off or treating them with petroleum. After egg hatch, it is recommended that larvae be collected.
ECentral; CONTROL, EGG MASSES, FLIGHT

627 Lindeman, K.E. 1894.
Control measures against the gypsy moth in the Novolil area of the Tula region. Sel'skiy khozyain. 44:906-907.
-- A high density of pest egg masses (up to 90 egg masses per tree) was observed in gardens and forests of the Province. It was suggested that they be collected and destroyed at least in the orchards. To compare expenditures and effect, treatment with petroleum was performed also.
ECentral; CONTROL, EGG MASSES

628 Lindeman, K.E. 1895.
The gypsy moth. In: O nasekomykh vredyashchikh lesam i merakh ikh istrebleniya. Moscow: 133-157.
-- Data are given on gypsy moth outbreaks in central and east Russia since the late 1860s. A single defoliation of forest species did not result in death of healthy trees, and caused only some loss of increment during the outbreak year. The damage to orchards was more pronounced and there was no crop in the year of defoliation. Pest polyphagy is discussed and a list of food plants is given. The reference includes data on pest phenology and biology, entomophages, and diseases. Control measures such as egg mass destruction and sticky belts are suggested.
ECentral, EEast; CONTROL, DEFOLIATION, PARASITES, PREDATORS, TREE HEALTH

629 Lipskiy, V.G. 1983.
The gypsy moth. Zashchita rasteniy. (10):64.
-- Species ecology and principal control measures are outlined.
EWest; CONTROL, GENERAL BIOLOGY

630 Litvinchuk, L.N. 1988.
Patterns of establishment of the gypsy moth population during the stage of depression in Priobsk

forest-steppe. In: Neparnyy shelkopryad: itogi i perspektivy issledovanniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 32-33.
-- Gypsy moth population structure was studied in the floodplain forests of the upper reaches of the Ob River from 1983 to 1985. The objective was to determine what food plants of Ob forests were preferred by the pest during a population depression. Larvae were reared on 4 major species: birch, willow, bird cherry, and hawthorn, with the density of insects ranging from 5 to 50 in the variant. Principal biological parameters (survival, weight, fecundity) were estimated. The different pupal weights were determined by food species and density of insects, decreasing in the following order: willow, bird cherry, hawthorn, birch; there was an increase in the number of insects in the variant. In the collapsing focus, the mean value of pupal weight at the depression phase becomes relatively independent of the food plant on which larvae develop. Generally, average fecundity of females is equal on each species tested, but groups of heavier insects can appear on willow. It is a micropopulation of high productivity that can drastically increase density. A conclusion is made that the character of insect-plant trophic relations is different at different stages of gypsy moth population gradation, the most stable trophic relations being with willow and bird cherry.
WSiberia; DENSITY, DEVELOPMENT, HOST PLANTS, REARING

631 Litvinchuk, L.N. 1988.
Patterns of trophic relations between the gypsy moth, *Lymantria dispar* L. (Lepidoptera, Orgyidae) and pine trees in the forests of the Ob River Basin. In: Voprosy ekologii bespozvonochnykh. Tomsk University, Tomsk: 7-13.
-- In the forests along the Ob River, gypsy moth egg hatch occurs when needles are viable on pine shoots of the current year. Trophic relations between pest larvae and pine are established in the year when phenophases of the gypsy moth and pine coincide.
WSiberia; HOST PLANTS, PHENOLOGY

632 Logoida, S.S. 1978.
Gypsy moth outbreak in oak forests of the Carpathian region and its population dynamics during the period 1970-1976. Nauchnyye doklady vysshey shkoly, biologicheskiye nauki. (2):59-65.
-- Data are given on gypsy moth outbreaks in oak groves of the Carpathian region for the last 50 years. During some years, qualitative and quantitative parameters of the pest population were studied. On the basis of these studies, pest distribution and population dynamics are described, taking into account the effect of biotic and abiotic factors as well as the impact of eradication measures.
EWest; POPULATION DYNAMICS

633 Logoida, S.S. 1982.
Recommendations on updating the inventory of gypsy moth pupal and larval density. In: Rekomendatsii po okhrane prirody Karpat v svete resheniy 24-go s"yezda KPSS. Uzhgorod: 131-135.
-- To make a scientific forecast of gypsy moth population dynamics, accurate data on population density during the period in question are needed. A mathematical method for calculating the number of model branches needed in relation to egg mass density in different cenoses is suggested so that detailed, reliable, labor-saving monitoring of the pest at larval and pupal stages can be conducted.
EWest; DENSITY, LARVAE, MODELS, SAMPLING

634 Logoida, S.S. 1988.
An interval estimation of the degree of gypsy moth infestation. Lesnoye khozyaystvo. (12):42-43.
-- Sequential estimation of the rate of oak stand infestation by the gypsy moth in the Carpathian region is presented, including interval estimation of the ecological density of the population.
EWest; DENSITY, MODELS, SAMPLING

635 Logoida, S.S. 1988.
Some results of a forecast-aimed study of gypsy moth in oak groves of the Carpathian region. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 23-34.
-- The gypsy moth is a serious pest of plain oak forests of the Carpathian region. Outbreaks have been recorded since 1916; nine gradation phases are recognized. The author studied the outbreaks of 1964-1967, 1970-1979, and 1986. Primary pest outbreaks originate mainly in light stands without undergrowth. An outbreak starts during the second or third year of a dry period, during larval and pupal stages, and the flight season of adults. Hibernation conditions do not affect population development. Major diseases are polyhedrosis and microsporidiosis. Parasites and predators are the most effective biotic factor causing pest population reduction. The author extracted 35 entomophagous species from larvae and pupae: 10 ichneumonid species, 6 braconid species, 2 chalcid species, 11 tachinid species, 4 sarcophagid species, 1 muscid species, and 1 parasitic nematode species. Four larval morphotypes are distinguished in the population: dark grey, light grey, larvae with a black dorsal stripe, and yellow. The morphotype ratio reflects the condition of the population. Suggestions for forecasting pest populations are given.
EWest; COLOR POLYMORPHISM, MICROSPORIDIA, PARASITES, PREDATORS, PROGNOSIS, STAND COMPOSITION, VIRUS, WEATHER

636 Logoida, S.S. 1990.
The effect of pyrethroids on destructive and beneficial entomofauna of oak groves. Lesnoye khozyaystvo. (6):52-53.
-- In 1987, an investigation in the Carpathian forests was conducted to study the efficacy of six pyrethroids to control an oak pest phyllophage complex. Their effect on beneficial entomocomplexes of oak phytocenosis also was studied. Being highly effective against phytophages, these preparations all have a negative effect on beneficial entomofauna. Pyrethroids should be applied only in early spring to ensure effectiveness.
EWest; CHEMICAL INSECTICIDES

637 Lopatina, N.V. 1971.

A comparison of the effect of phytoncide and toxic chemicals on the gypsy moth and the tent caterpillar. In: Biologicheskaya zashchita plodovykh i ovoshchnykh kul'tur. Shtiintsa, Kishinev: 213.
-- Phytoncides of iris and desert-candle possessing insecticide properties were tested. Phytoncide and insecticide doses equal to LD 50 for the early fourth instar were fed to insects. As a result of phytoncide action, death of insects or disruption of their physiological processes were observed throughout the experiment. Comparative data suggest a similar inhibitory effect of phytoncides and insecticides on insect organisms.
NATURAL PLANT PRODUCTS

638 Lopatina, N.V. 1974.
The effect of phytoncides on the midgut structure and on some metabolic prosesses in the silkworms. In: Patologiya chlenistonogikh i biologicheskiye sredstva bor'by s vrednymi organizmami. Tezisy dokladov I gorodskoy konferentsii. Kiev: 106-108.
-- Fourth instars of the silkworm, the gypsy moth, and the tent caterpillar were used in the experiments. Diluted phytoncides of Tien Shan iris and desert-candle 1:30 and 1:600, and the synthetic analogue of garlic phytoncide, pseudoallicin-323 (1:300) were orally administered to the insects. For reference, the insecticides Sevin (0.025) and methation (0.05) were fed to the larvae. Phytoncides clearly exhibited insecticidal properties, causing changes in the alimentary canal, a reduction of storage substances (total lipids), and a decrease in insect respiration intensity. Additionally, phytoncides have a long-term effect on insect physiology while application of insecticides does not lead to irreversible physiological changes.
EWest; BIOASSAY, NATURAL PLANT PRODUCTS, PHYSIOLOGY

639 Lozinskiy, V.A. 1960.
Effect of flood waters on the occurrence of lepidopterous pest foci. Zoologicheskiy zhurnal. 39(10):1515-1520.
-- Infestation of willows with gypsy egg masses was studied in the floodplains of rivers in the Zacarpatye and Odessa Provinces. Absolute and relative infestation by the gypsy moth is much higher in the flooded area of stands than in the unflooded area. Surveys show that in the unflooded area a large number of entomophages congregate in the litter, while in the flooded area the litter is removed by flood in spring. In unflooded plots, the physiological condition of trees is better; there are more tannins in the leaves, which inhibit larval development. In addition, foci usually occur in the sites where soil is compacted as a result of floods or other factors, such as cattle grazing.
EWest; FOLIAGE CHEMISTRY, SITE CONDITIONS

640 Lozinskiy, V.A., Romanova, Yu.A. 1965.
Effect of favorable components in gypsy moth foci in flood-plain forests of the Dniester River Basin. In: Issledovaniya po biologicheskomu metodu bor'by s vreditelyami sel'skogo i lesnogo khozyaystva. Novosibirsk: 92-94.
-- In 1958-1959, entomological investigations and inventories were made in gypsy moth foci in natural willow stands of the Dniester Delta. Outbreaks were recorded from 1947-1952, and from 1954-1959. In 1959, epizootics reduced pest numbers. In the foci located in the unflooded area there were 7.6 larvae of *Calosoma calidum* per 1 sq. m, 2.3 braconid adults, and 0.2 tachinid adults in the litter. Dermestids and birds attacked 9.7% of the egg masses in the flooded area of the focus, and 51.3% in the unflooded area; egg parasitism comprised 69-40.3% and 8.2%, respectively. No chemical treatments were applied, which contributed to the preservation of entomophages.
EWest; BIRDS, NUMERICAL DATA, PARASITES, PREDATORS

641 Lozovoy, D.I. 1941.
Destructive entomofauna in the forests of Georgia. In: Trudy zoologicheskogo sektora Gruzinskogo filiala AN SSSR. Tbilisi: 191-207.
-- The gypsy moth is mentioned among 25 lepidopterous insects that are important forest pests in Georgia. A great number of egg masses were found on sea buckthorn (*Hippophae rhamnoides* L.) in Batumi in the autumn of 1938.
Caucasus; OVIPOSITION SITE, PEST LIST

642 Lozovoy, D.I. 1948.
Insect pests of parklands in the city of Tbilisi. In: Vestnik Tbilisskogo botanicheskogo sada. Tbilisi: 3-14.
Caucasus; PEST LIST

643 Lozovoy, D.I. 1953.
The gypsy moth in park and forest stands of Georgia. In: Vestnik Tbilisskogo botanicheskogo sada. Tbilisi: 12-24.
Caucasus; GENERAL BIOLOGY

644 Lozovoy, D.I. 1954.
Ecological and geographical features of the most important forest insect pests and criteria for their control in Georgian SSR. In: III ekologicheskaya konferentsiya. Tezisy dokladov. Kievskyi gosudarstvennyi universitet, Kiev: 142-147.
-- Data are given on pest complexes inhabiting different forest plants in Georgia. The gypsy moth is found in lowland paludal alder-poplar forests, in broad-leaved lowland forests, flood plain forests, and in mountain forests of the lower belt in which various oak species dominated. The gypsy moth is regarded as a pest of alder, poplar, oak, and willow.
Caucasus; HOST PLANTS, PEST LIST, STAND COMPOSITION

645 Lozovoy, D.I. 1956.
Ecological, geographical and distributional patterns of the most important insect pests and principal control measures in Georgian SSR. Zoologicheskiy zhurnal. 35:365-372.
-- The gypsy moth is recorded as an important pest of various hardwood species in forest biocenoses of Georgia. In lowland forests of western Georgia, it attacks alder and poplar, has outbreaks in broad-leaved lowland forests and mountain forests of the lower belt where various oak species prevail. Species composition of

important pests in the forests of West Georgia is quite different from that found in East Georgia.
Caucasus; HOST PLANTS, STAND COMPOSITION

646 Lozovoy, D.I. 1956.
Insect pests in the park and forest-park stands of the city of Rustavi. In: Vestnik Tbilisskogo botanicheskogo sada. Tbilisi: 179-192.
-- The gypsy moth is an important outbreak species of the stands near Rustavi. Protective measures must be based on correct selection of species composition of parklands.
Caucasus; HOST PLANTS, PEST LIST, STAND COMPOSITION

647 Luchnik, V. 1925.
A list of insects damaging plants in the Stavropol area in 1924. In: Izvestiya Stavropol'skoy stantsii zashchity rasteniy. Stavropol: 9-15.
-- The list of pests includes 49 insect species, with the gypsy moth mentioned among 12 important lepidopterous pests. Its numbers are usually limited, but in 1923-1925 an outbreak (40 to 60 egg masses per tree) was recorded. During the outbreak, larvae defoliated all trees and shrubs except ash and pear.
Caucasus; DENSITY, EGG MASSES, PEST LIST

648 Luchnik, V. 1926.
A list of insects damaging plants in the Stavropol area in 1925. In: Izvestiya Stavropol'skoy stantsii zashchity rasteniy. Stavropol: 12-24.
-- The gypsy moth is listed among 96 pests of plants. In 1925, the outbreak collapsed but new foci originated in some locations. The most active entomophages in the foci were larvae and adults of *Calosoma.* Also mentioned are *Xylodrepa quadripunctata* L. and *Thrombidium* species, which destroy eggs.
Caucasus; PEST LIST, PREDATORS

649 Luchnik, V. 1927.
A list of insects damaging plants in the Stavropol area in 1926. In: Izvestiya Stavropol'skoy stantsii zashchity rasteniy. Stavropol: 33-38.
-- Forty-three pest species are mentioned, including the gypsy moth. It is believed that further decrease in pest number was mainly due to entomophages. *Calosoma* was the most active entomophage destroying gypsy moth larvae and pupae.
EWest; PEST LIST, PREDATORS

650 Luchnik, V. 1928.
Insect pests in the Stavropol area in 1927. In: Izvestiya Stavropol'skoy stantsii zashchity rasteniy. Stavropol: 22-31.
-- The gypsy moth is mentioned among 95 species. In the period reported, the species is in depression and few individuals are recorded.
Caucasus; NUMERICAL DATA, PEST LIST

651 Luky'anov, M. 1893.
***Ocneria dispar* L. in Tula region.** Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. 23(4):34-38.
ECentral; GENERAL BIOLOGY

652 Lyamtsev, N.I. 1981.
Biometric dependence of gypsy moth fecundity on the body size of its pupae and larvae. In: Rol' nauki v sozdanii lesov budushchego. Tezisy dokladov Vsesoyuznoy konferentsii, Pushkino. Leningrad: 165-166.
-- In 1978, in oak shrubwoods of Saratov Province, a strong correlation of fecundity to weight and length of gypsy moth female pupae, to wing length of adult and to the product of pupal length by width was established. Correlations obtained provide a means for estimating fecundity even at low density levels.
ECentral; FECUNDITY, MODELS, STAND COMPOSITION

653 Lyamtsev, N.I. 1981.
The effect of stand composition on some indicators of gypsy moth population dynamics. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Pushkino: 122-124.
-- Surveys were made in Saratov Province from 1977 to 1980. It was found that the most important stand characteristic was the proportion of favored food species positively correlating to gypsy moth population density. During the outbreak period, the correlation coefficient is lower, the pest ecological valence is higher, and it occupies a greater variety of stations. The species most favorable to the gypsy moth are oak shrubwoods of the third or fourth age class, third or fourth quality class, 0.4-0.8 density, and with few non-oak species. Much less favorable are mixed stands in which oak comprises less than 70%. Pest aggregation increases as its density decreases, while during an outbreak infestation of different forest plots it becomes uniform. Stand structure also is important for population quality, and egg weight is considerably higher in the stands favorable for gypsy moth development.
ECentral; STAND COMPOSITION

654 Lyamtsev, N.I. 1981.
Forecasting the quality of a gypsy moth population by egg weight. Lesnoye khozyaystvo. (4):60-61.
-- Correlations between egg weight, survival, the number of eggs per mass, and gypsy moth multiplication coefficient can be used for forecasting pest populations.
ECentral; EGGS, MODELS, POPULATION QUALITY, PROGNOSIS

655 Lyamtsev, N.I. 1981.
Distributional pattern of the gypsy moth egg masses in connection with changes in its abundance. (Kharakter raspredeleniya plodovitosti neparnogo shelkopryada v svyazi s izmeneniyem ego chislennosti.) VNII lesovodstva i mekhanizatsii lesnogo khozyaistva, Pushkino. 7 p. (Deposited Document. TsBNTI Leskhos N.77-LD)
-- Peculiarities of gypsy moth egg mass distribution by egg size and number in 1977 to 1980 are shown. Distribution is not normal and exhibits positive asymmetry. The highest value of the asymmetry coefficient characterizes the transfer from the outbreak culmination to the crisis phase. In a low gypsy moth population,

density distribution is close to normal. The asymmetry coefficient changes regularly with pest variability, fecundity, population density, population quality, and gradation phase; hence, it can be used in forecasting a pest population.
ECentral; EGGS, EGG MASSES, PROGNOSIS, SAMPLING

656 Lyamtsev, N.I. 1982.
Estimation of gypsy moth fecundity by egg mass size. In: Molodyye uchenyye v sovershenstvovanii teorii i praktiki vedeniya lesnogo khozyaystva. Trudy nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhaniza*sii lesnogo khozyaystva, Pushkino, 1982. Pushkino: 150-153.
-- The least labor-consuming method of estimating actual fecundity of the gypsy moth is by a regression equation describing the correlation between egg mass size and the number of eggs it contains. Investigations carried out in the Saratov Province from 1977 to 1980 prove that variation in length and width of egg masses can account for about 70% of the difference in the number of eggs in the mass. Parameters of the coupling equations described in detail in this publication differ at different gradation phases as egg weight and egg mass dimensions change. So, the model obtained is more fit for the crisis phase and the depression period of the gypsy moth population.
ECentral; EGG MASSES, MODELS, MORPHOMETRICS, SAMPLING

657 Lyamtsev, N.I. 1983.
Impact of weather on changes in gypsy moth density. In: Molodyye uchenyye k yubileyu instituta. Trudy nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstba i mekhanizatsii lesnogo khozyaystva Gosleskhoza SSSR. VNIILM, Pushkino: 188-194.
-- Data obtained from 1978 to 1982 show that warm, dry weather is favorable for gypsy moth development in the Saratov Province, particularly for development of early instars. Hard frosts during this period and during egg hatch produce a negative effect on the population, causing immediate death of larvae, lower viability due to the freezing of leaves, and the disruption of synchronous development of the gypsy moth and its food plant. A positive correlation is established between the lowest temperature in the developmental period of instars I and II, and the multiplication coefficient. Winter frosts with the lowest temperature at 40° C do not cause the death of embryos if egg masses are below the level of snow cover. Gypsy moth fecundity increases as the average temperature rises to a certain limit, about 21° C, in July and August, when later instars develop, adults fly and oviposit. The period of larval and pupal development was the longest in 1978 (80 days) and the shortest (65 days) in 1981. The mean air temperature was 14.7° C and 18.5° C, respectively.
ECentral; DEVELOPMENT, TEMPERATURE, WEATHER

658 Lyamtsev, N.I. 1984.
Color index of gypsy moth larvae and a prediction of its density. In: Nauchno-tekhnicheskoye tvorchestvo molodykh uchenykh - lesnomu khozyaystvu. Materialy VII nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva. VNIILM, Pushkino: 198-202.
-- As a result of surveys of gypsy moth populations made in the Saratov Province from 1978 to 1983, instars IV to VI were subdivided into 3 morphotypes: grey, red, and black. At the crisis phase, the proportion of red larvae declined from 36-40% in the fourth instar to 1-4% in the sixth instar, while the proportion of grey larvae increased from 58-63% to 96-98%. The proportion of black larvae declined insignificantly over this period. Parasitism of red larvae by Apanteles was two times higher and their sex index (0.13-10.18) three times lower when compared to grey larvae. Larval morphotype ratio regularly varied in the course of gradation, which makes it useful for forecasting gypsy moth populations. At the crisis phase and in the period of depression, the occurrence of grey, red, and black instar V was 82.0, 17.5, and 0.5%, respectively. The onset of an outbreak is characterized by a decrease in the proportion of red larvae and the predominance of grey larvae (95% and higher), which are more viable.
ECentral; COLOR POLYMORPHISM, POPULATION FLUCTUATION, PROGNOSIS

659 Lyamtsev, N.I. 1986.
Fecundity as an indicator of gypsy moth population dynamics. In: Materialy VIII nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva. VNIILM, Moscow: 126-129.
-- As a result of surveys in oak shrubwoods of the Saratov Province, a strong correlation is established between the number of eggs in a mass and the initial density of a gypsy moth population (r = 0.938), temperature in July (r = 0.642), multiplication coefficient for the generation to come (r =0.780), and food quality and quantity. Variation in fecundity is an important intrapopulation regulatory mechanism. To estimate fecundity, the number of eggs per mass should be taken into account as well as mean egg weight. The value of these parameters is the lowest in the period of outbreak culmination (172 +- 5.1 eggs, 0.674 +- 0.005 mg). The crisis phase and the period of depression are characterized by maximum egg weight (0.816-0.846 mg), while fecundity is somewhat lower than average (230-286 eggs). When the depression period is over, the number of eggs per mass drastically increases (up to 370-427 eggs) and the egg weight is average (0.740-0.790 mg).
ECentral; DENSITY, FECUNDITY, PROGNOSIS

660 Lyamtsev, N.I. 1986.
A study of ecological-populational indicators of gypsy moth density prognosis in oak groves of the forest steppe. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Moscow. 20 p.
-- Data on gypsy moth ecology in the Saratov Province were obtained at a low population level. The role of intrapopulational mechanisms and other biotic regulatory mechanisms is shown. It is established that population condition and structure change in the flex points of a gradation curve, and they change gradually at all phases of population decrease and increase. A full quantitative description of population parameters is given for the first

time, including their interrelations and variations with gradation phases. Asymmetry of fecundity value distribution and the rate of population aggregation in space are suggested as criteria for gradation phases. Relation of population parameters (birth rate, mortality, fecundity, multiplication coefficient) to the number and condition of gypsy moth populations in the previous gradation, weather conditions, and stand structure is analytically expressed. These data can be used to forecast species population in the forest-steppe.
ECentral; MODELS, PROGNOSIS

661 Lyapchenko, L.V. 1969.
The gypsy moth and the browntail moth in forests of Tatarian SSR and Ulyanovsk area and their control. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. (4):152-153.
ECentral; CONTROL, GENERAL BIOLOGY

662 Lyashenko, L.I. 1981.
The use of pyrethroid insecticides and Dimilin against folivorous insects. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 124-126.
-- In Rostov and Lipetsk Provinces, forests damaged by the gypsy moth were treated with a pyrethroid (25% Ambush) and Dimilin. The 25% Ambush caused 98.2% mortality of instars II and III, and the expenditure rate was 12.5 g/ha. Autumn counts of egg masses of the next generation showed a decrease or more than 98% in the pest population. Dimilin caused 99.0-99.3-89.1% mortality of gypsy moth larvae, the expenditure rate being 62.5, 31.25, and 10.0 g/ha, respectively. A general decrease in the number in the third variant was 99.3%, counted by egg masses. In the next generation, 45.3% of the eggs were unfertilized as a result of the tetratogenous effect of Dimilin. The bulk of gypsy moth larvae die 10 to 18 days after treatment.
ECentral; CHEMICAL INSECTICIDES, GROWTH REGULATORS

663 Lyashenko, P.I., Andreeva, G.I. 1979.
The use of Dimilin for control of forest pests. Zashchita rasteniy. (6):3-21.
EWest; GROWTH REGULATORS

664 Lysenko, M.A., Abdulaev, A.A. 1968.
Dynamics of larval mortality in some lepidopterans when treated with allicin analogues. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. Kiev: 124-127.
-- Survival of different instars of the gypsy moth and the tent caterpillar, when treated with pseudoallicins, was studied. Pseudoallicins revealed a more pronounced insecticidal effect than allicin. Insect survival depended on species and instar in which they were treated and on the preparation concentration.
EWest; BIOASSAY, NATURAL PLANT PRODUCTS

665 Lysenko, M.A., Cherbanik, D.D., Zhuk, Ye.Ye. 1970.
Changes in survival and hemolymph cell composition in gypsy moth after treatment with phytoncides. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USGA, Kiev: 62-66.
-- Gypsy moth survival and hemolymph cell composition of larvae subjected to the action of nine phytoncides in the second instar were studied. Preparations were found to possess different insecticide properties and to cause 6% to 50% mortality of insects. In the hemolymph of the larvae treated with phytoncides, the content of proleucocytes and macronucleocytes decreases while the content of phagocytes, enocytes, pathological and dead cells increases. The preparation produced from Haplophyllum obtusifolium Lebed. appeared to produce the most toxic effect on gypsy moth larvae.
EWest; BIOASSAY, HEMOLYMPH, NATURAL PLANT PRODUCTS

666 Lysenko, M.A., Zemkova, R.I., Shvachko, N.V. 1976.
Patterns of food specialization in first-instar gypsy moth larvae. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Zashchita rasteniy ot vrediteley i bolezney. USKhA, Kiev: 12-13.
-- Food specialization of first instars of the gypsy moth was studied. Twenty-five plant species were tested. Selection of food by first instars is determined by the degree of leaf coarseness. Some tree species, late oak, for example, are not attacked by the gypsy moth as tree foliation and pest egg hatch occur at different times. As leaves grow coarse, favored food species (early oak, quince) become unsuitable for feeding by first instar gypsy moth. Life cycle and food specialization of the gypsy moth prove to be strongly correlated to food species.
EWest; FOLIAGE QUALITY, HOST PLANTS, PHENOLOGY, REARING

667 Lyubarskiy, L.V., Nakonechny, V.I. 1970.
Entomophages of the gypsy moth population, *Ocneria (Lymantria) dispar praeterea* Kand. (Lepidopetera, Orgyidae), in Priamurye. In: Sbornik trudov Dal'nevostochnogo NII lesnogo khozyaystva. Dal'NIILKh, Khabarovsk: 221-230.
-- Ecological peculiarities of the local form of gypsy moth in Amur Province are considered. The species of the primary entomophages of the pest include 40 species of 25 genera (3 braconid species, 3 ichneumon species, 24 tachinid species, 8 sarcophagid species, 2 muscid species). Peculiarities of parasite complex are discussed and the effect of entomophages on gradation of the gypsy moth population in the Amur Province is described.
Far East; PARASITES, POPULATION DYNAMICS

668 Makaryan, M.Ya., Avetyan, A.S. 1931.
***Porthetria (Lymantria, Ocneria) dispar* L.** In: Obzor vrediteley sel'skokhozyaystvennykh i lesnykh rasteniy Armenii. Erevan: 29-30.
-- The gypsy moth is a common species in the Araks River valley. Major food plants it infests in the agricultural region of Armenia are apple, pear, quince, apricot, plum, and willow. In 1929 an insignificant pest focus was registered. Species ecology and behavior include nocturnal migrations and sheltering in the daytime (at the butt, under hedge stones, in cracks in the bark).
Caucasus; BEHAVIOR, HOST PLANTS, LARVAE

669 Makhnovskiy, I.K. 1955.
The gypsy moth, *Ocneria dispar* L. In: Vrediteli zashchitnykh lesnykh nasazhdeniy Sredney Azii i mery bor'by s nimi. Gosizdat Uzb.SSR, Tashkent: 166-169.
-- The gypsy moth, one of the most serious pests of plantations and hardwood forests in Central Asia, is an outbreak species whose main enemies are cuckoos and *Calosoma*. The author describes life stages, major food plants, phenology, and some ethological peculiarities. Collection of egg masses and treatment with petroleum as well as DDT and calcium arsenite are suggested as control measures.
MAsia; CHEMICAL INSECTICIDES, CONTROL, PREDATORS

670 Makhnovskiy, I.K. 1966.
The gypsy moth. In: Vrediteli gornykh lesov i bor'ba s nimi. Lesnaya promyshlennost', Moscow: 70-71.
-- A serious pest of mountain nut forests in Central Asia, the gypsy moth's primary foci originate in light stands. In closed stands of a mountain forest belt, the pest does not produce stable foci and, as a rule, damage is insignificant. Outbreaks are recorded on pistachio in southern Kirgizia, in mountain forests and apricot orchards of Turkmenistan, in Uzbekistan, and in southeastern Kazakhstan. Data on general species ecology in the region suggest that pest fecundity is 100 to 650 eggs, sometimes as high as 1,500; egg masses are usually deposited at the tree base, but sometimes can be found at a height of 4 to 5 m.
MAsia; FECUNDITY, OVIPOSITION SITE, STAND COMPOSITION

671 Makhnovskiy, I.K. 1972.
Insect pests, their biology and control in the mountainous forests of Middle Asia. Avtoreferat dissertatsii doktora biologicheskikh nauk. Tashkent. 50 p.
-- Polytrophic phyllophages such as the gypsy moth are, as a rule, pests of secondary importance in nut forests in Central Asia. Major entomophages consuming these pests are dipterans and *Calosoma*.
MAsia; GENERAL BIOLOGY

672 Makhnovskiy, I.K., Romanchenko, K.Ye., Chebotarev, I.N. 1963.
Nut woodlands and their protection in Kirgizia. In: Orekhoplodnyye lesa Kirgizii i okhrana ikh ot vrediteley. Kirgizgosizdat, Frunze: 154.
MAsia; CONTROL

673 Malokvasova, T.S. 1973.
Susceptibility of the gypsy moth to infection with *Bacillus entomocidus* var. *entomocidus* in test experiments. In: Trudy Dal'nevostochnogo NII lesnogo khozyaystva. Ispol'zovaniye i vosproizvedeniye lesnykh resursov Dal'nego Vostoka. Dal'NIILKh, Khabarovsk: 333-337.
-- Gypsy moth larvae were infected with different doses of *B. entomocidus* var. *entomocidus* in a laboratory experiment. Pathogenicity of the bacillus tested for gypsy moth larvae was established, and the relation of disease generalization to infection rate was noted.
Far East; BACTERIA, BIOASSAY, MICROBIAL PESTICIDES

674 Malokvasova, T.S. 1983.
Efficacy of preparation made on the basis of *Bacillus thuringiensis* Berl. for gypsy moth control in Primorye region. In: Trudy Dal'nevostochnogo NII lesnogo khozyaystva. Dal'NIILKh, Khabarovsk: 140-146.
-- In laboratory and field experiments in southern Primorye from 1972 to 1981, resistance of gypsy moth larvae to inoculation with crystal-forming bacteria was found to be relatively high in the period of population increase. Therefore, extermination by application of bacterial preparations seems unreasonable during this period. The results of biological control can be improved by application of highly virulent natural isolates. Early and middle instars collected at the eruption phase of a gypsy moth outbreak are highly sensitive to bacterial preparations, while later instars are more resistant to crystallophorous bacteria. Middle instars are more sensitive at the crisis phase than at the prodromic and eruption phases of an outbreak. Higher sensitivity is the result of the accumulation of latent infections and the associated deterioration in physiological condition. Environmental conditions, primarily temperature and humidity, are not important factors affecting the entomocidal activity of preparations. The optimum dose for killing early and middle instars is a bacterial suspension of a titer of 1 billion spores per 1 ml of liquid.
Far East; BACTERIA, BIOASSAY, MICROBIAL PESTICIDES

675 Malokvasova, T.S. 1988.
Crystal-forming bacilli in gypsy moth population in the Far East and their biological activity. In: Nepamyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 39.
-- Collection of healthy gypsy moth specimens for microscopic examination and microbiological assay beginning in 1969 covered different gradation phases. Data were obtained on inoculation of the gypsy moth with crystal-forming bacilli under different ecological conditions. Biological activity of bacterial isolates was estimated. In low pest populations, no inoculation of larvae with crystal-forming bacilli was observed; at high population levels, during the crisis phase, when entomopathogenic viruses prevailed, crystal-forming bacilli played an insignificant part. Their contribution ranged from 0 to 20% in different foci. Bacilli found in killed gypsy moth larvae were isolated into pure culture, and their biological activity against the tent caterpillar, the Siberian moth, the gypsy moth, the apple moth, the satin moth, and the fall webworm was tested. None of the isolates was highly effective against the gypsy moth, but some isolates were active against other entomophages. One of the reasons for the unstable efficacy of bacterial preparations against the gypsy moth in the Far East is the microbial background of insect intestines, which affects pathogenic bacteria.
Far East; BACTERIA, MICROBIAL PESTICIDES, POPULATION DYNAMICS

676 Maltsev, I V. 1954.

The gypsy moth *Porthetria dispar* L. In: Vrednyye nasekomyye lesonasazhdeniy stepnogo Kryma i mery bor'by s nimi. Krymizdat, Simferopol: 23-25.
-- The life stages of the gypsy moth are traced. Pupation starts in late May, with pupae found between leaves or under bark flaps. Adults are active from the second half of June to the end of July, depositing egg masses low on tree trunks or occasionally at the trunk base, on dead leaves, stones, or on the ground. Fecundity is 150 to 600 eggs. In the Crimea, the gypsy moth feeds on more than 270 species of trees, shrubs, and herbs; it does not attack ash, elaeagnus, or tamarisk. It occurs rarely in the steppes, except in parklands along the Salgir and Karasevka Rivers. Suggested control measures are collection of egg masses and treatment with petroleum, DDT, and calcium arsenite.
EWest; CHEMICAL INSECTICIDES, FECUNDITY, HOST PLANTS, OVIPOSITION SITE, PHENOLOGY

677 Malyy, L.P., Krushchev, L.T., Likhovidov, V.Ye., Kuksenkov, V.M., Sinchuk, I.V. 1978.
The use of bacterial preparations against oak defoliators. Lesnoye khozyaystvo. (11):84-85.
-- Rock oak, English oak, hornbeam, ash, Norway maple, common maple, linden, and cherry grow in the Kodry Preserve (Moldova). Gomelin, in powder and paste forms, was applied against the winter moth, the green oak leaf roller, and the scribbler. The efficiency rate was 87%.
EWest; BACTERIA, MICROBIAL PESTICIDES

678 Mamedov, Z.M. 1988.
Parasites of the brown-tail moth (*Euproctis chrysorrhoea* L.) and the gypsy moth (*Lymantria dispar* L.) in the gardens of Azerbaijan. Izvestiya Akademii nauk Azerbaidzhanskoi SSR, seriya biologicheskie nauki. 4:75-77.
-- Sixteen species of parasites play an important part in regulating numbers of browntail moth larvae and pupae, five of which are the most effective. There are 18 species affecting the gypsy moth, with seven being the most effective and reducing pest populations by 15% to 24%. *Phanerotoma atra* is mentioned for the first time as a parasite of the gypsy moth in the former USSR.
MAsia; PARASITES

679 Mamontova, V.A., Derevyanko, N.M., Nikitenko, G.N., Galanova, T.F. 1983.
Structural and functional features of gypsy moth populations connected with different food plants. In: Rol' vzaimootnosheniy rasteniye-nasekomoye v dinamike chislennosti populyatsiy lesnykh vrediteley. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 112-125.
-- The distribution and population dynamics of the gypsy moth were studied in the lower Dnieper region. Distribution is determined by food specialization in different foci. Feeding on willow (plavni of the Dnieper River), oak (forest "islands" of the Black Sea Preserve), or acacia (plantations) resulted in the formation of food races, or micropopulations, differing in phenological development and gradation phases. In the course of the investigation, peculiarities of behavior at different life stages and gradation phases were discovered, the distribution of egg masses on different species of trees and at different heights on the trunk was studied, and migration activity of larvae in different instars as well as daily activity of males and females was investigated. The phenotypic structure of the population was determined by larval coloration. Biochemical analysis of the dynamics of soluble protein fraction composition, as well as the forms and activity of hydrolytic enzymes of hemolymph and tissues in the ontogeny of insects belonging to different phenotypes, was made. Peculiarities of protein composition, enzyme forms, and activity were used to distinguish among phenotypes of homo- and heterozygotes and insects feeding on different food plants. At a certain gradation phase, the ratio of larvae with high and low protein content in hemolymph changes, determining the level of adult fecundity.
EWest; BIOCHEMISTRY, COLOR POLYMORPHISM, POPULATION DYNAMICS

680 Markov, V.A. 1983.
Use of attractant traps. Lesnoye khozyaystvo. (6):57-58.
-- Disparlure-baited traps are used to estimate gypsy moth populations.
ECentral; PHEROMONE TRAPS

681 Markov, V.A. 1988.
Prolonged embryonal diapause in the gypsy moth. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 13-14.
-- Although it is generally believed that egg masses of previous seasons are unviable, the author found mature embryos of gypsy moth larvae in unhatched eggs. Surveys in Ryazan Province from 1978 to 1987 showed that some of the eggs that hibernated for a second time remained viable and produced offspring. During an outbreak, the majority of healthy eggs does not hatch the following spring. The fact that there are egg masses of the previous year in addition to egg masses of the new generation is a sign of partial long diapause. On the basis of an analysis of factors determining gypsy moth population dynamics, the author concludes that long embryonic diapause plays an important part in the period of gypsy moth outbreak. Taking into account this peculiarity of pest development, forecasting of populations can be improved and frequent and ineffective pesticide treatments polluting the environment can be avoided.
ECentral; DIAPAUSE, EGG HATCH

682 Marovich, P. 1975.
Efficacy of synthetic and natural sex attractants of the gypsy moth *Lymantria dispar* L. in field tests. In: VIII Mezhdunarodnyy kongress po zashchite rasteniy. Doklady i soobshcheniya sektsii 5. Biologicheskiye i geneticheskiye metody bor'by. Moscow: 113-121.
-- Cylindrical metal traps were hung at a height of 1.5 to 2.0 m. Disparlure based on trinoctanoin used for baiting was very stable and was active for at least 4 years after being placed in a trap. An increase in concentration from 20 to 600 mkg per trap did not result in an increase in the number of males captured. The maximum number of males in the traps during 3 years of surveys correlated with 3,000 mkg of the attractant. In the traps baited with natural attractant extracted from 12, 24, and 60 females,

the maximum numbers of males was at the lowest preparation concentration. The natural attractant was active in the traps during one season, while in ampules it remained active for 18 years.
EWest; PHEROMONE TRAPS, PHEROMONES

683 Martynova, Ye.F. 1952.
Peculiarities of lepidopterous fauna in the south Urals region and its significance for the steppe afforestation. In: Trudy zoologicheskogo instituta AN SSSR. Leningrad: 66-91.
-- In the region to the west of the South Urals, the gypsy moth inhabits floodplain and ravine forests. In 1949-1950, an increase in the pest population was observed in floodplain forests. The highest density of egg masses (2-3 per tree) was recorded in light, well-heated oak and oak-linden floodplain plots. Egg masses were found at tree bases, mainly on thin oaks, lindens, and aspens. In ravine forests there was a decrease in numbers of pests, caused by high concentrations of entomophages in adjacent foci of the tent caterpillar and the browntail moth, and by spring frosts.
EEast; DENSITY, EGG MASSES, OVIPOSITION SITE, SITE CONDITIONS

684 Marushina, N.G. 1981.
Comparison of sampling methods of the gypsy moth egg masses. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Moskva: 126-130.
-- A method of estimating gypsy moth population is suggested: in sample plots of 50 trees in a typical place in the focus, egg masses are counted along a strip 3 to 5 m wide, depending on the character of the stand, on the sides of the trees facing the course of survey; the number of egg masses found in the strip is doubled. Advantages of this method are discussed.
ECentral; EGG MASSES, SAMPLING

685 Marushina, N.G., Ashimov, K.S. 1984.
Gypsy moth in nut forests of the southern Kirgizia. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Kiev: 12-16.
-- Gypsy moth biological parameters were studied in nut forests of southern Kirgizia. Adult flight dynamics were correlated with the altitude above sea level at which stands are located. Flight is prolonged during nearly 3 months. Three well-defined flight peaks are determined by the altitude of stands. Other parameters studied were peculiarities of egg mass deposition on tree trunks and the distribution of larvae and pupae in tree crowns.
MAsia; FLIGHT, PHENOLOGY

686 Mashanov, A.I. 1988.
Plant protection against biological damage with a bacterial preparation insectin. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 40.
-- In mixed mountain forests of Tuva, the favored species of gypsy moth larvae are larch, birch, aspen, willow, and sweetbrier. Phyllophage foci are usually combined, for instance, joint foci of the Siberian moth and the gypsy moth. After aerial application of bacterial preparations, high mortality of gypsy moth larvae was registered in the foci. On food plants treated with the bacterial preparation insectin, lower feeding intensity and more rapid molting were recorded.
WSiberia; BACTERIA, HOST PLANTS, MICROBIAL PESTICIDES

687 Mashanov, A.I., Baranovskiy, V.I., Pakhtuev, A.I. 1980.
New bacterial preparations and their use in forest protection. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. 10(2):63-68.
-- The bacterial preparations tuverin-2 and insectin-2 were tested in the field against the Siberian moth and the pine looper moth. Tuverin-2 had an efficacy of 80.7%.
WSiberia; BACTERIA, MICROBIAL PESTICIDES

688 Mashanov, A.I., Gukasyan, A.B., Chulikov, A.I. 1981.
Microorganisms in forest protection. (Mikroorganizmy v zashchite lesa.) Nauka, Novosibirsk. 130 p.
-- The book describes the methods and results of applications of Bt-based pesticides in different zones of Siberia. *Lymantria dispar*, *Leucoma salicis* and *Dendrolimus superans* were the main target pests.
WSiberia; BACTERIA, MICROBIAL PESTICIDES

689 Mashnina, G.I., Fomina, V.I. 1974.
Susceptibility of gypsy moth and pine moth to bacterial preparations relative to larval instar and temperature. In: Lesokhozyaystvennaya nauka i praktika. Moskva: 154-157.
-- While gypsy moth and pine moth larvae in early instars are very susceptible to bacterial infections, late instar gypsy moth are more resistant. The efficacy of bacterial preparations is determined by temperature, with high efficacy recorded at temperatures above 23° C.
ECentral; BACTERIA, MICROBIAL PESTICIDES, TEMPERATURE

690 Masyuk, Yu. A., Orlovkaya, Ye.V., Bayukova, A.Yu. 1978.
Accumulation of virus biomass by gypsy moth larvae relative to their age and body weight. In: Microbiologicheskiye sredstva zashchity rasteniy i bakterial'nyye preparaty. Moscow: 58-62.
ECentral; VIRUS

691 Matskevich, M.N. 1978.
Parasites of the gypsy moth. Zashchita rasteniy. (9):24.
-- In Gorky Province, 23 parasite species were extracted from gypsy moth eggs, larvae, and pupae. The tachinid is a specialized parasite of the gypsy moth. Of the total pest number, 27% are parasitized.
ECentral; OVIPOSITION SITE, PARASITES

692 Matvievskiy, A.S. 1954.
Evaluation of accuracy of the methods of sampling gypsy moth *Ocneria dispar* L. egg masses and their improvement. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Leningrad. 13 p.
ECentral; EGG MASSES, SAMPLING

693 Matvievskiy, A.S. 1984.

Control of pests and diseases in the orchards. Zashchita rasteniy. (2):58.
-- Trichlor 5 or Trichlorol 5m was applied against scales, tortoise scales, early instars of the apple moth and gypsy moth, fruit mite eggs, plant lice, and psyllas. Efficacy was 76%.
ECentral; CHEMICAL INSECTICIDES, PEST LIST

694 Mazokhin-Porshnyakov, G.A., Kazyakina, V.I. 1984. **Structure of visual organs in the gypsy moth larvae (Lepidoptera, Lymantriidae).** Entomologicheskoye obozrenie. 63(1):29-34.
-- The appearance and inner structure of six stemmas of last instar gypsy moth are described. There are three mantle, three crystal, and seven retinula (three distal and four proximal) cells in each stemma. Retinula cells, which make a fused rhabdom with digital appendages, are packed with granules of screening pigment. In triple stemmas (stemmas 1 and 6 [Dethier 1942]), the top of the rhabdom is bifurcated. The gypsy moth stemma combines features of *Operophtera brumata* L. and *Macrothylacia rubi* L. stemmas. Phylogenesis and stemma functions are discussed.
ECentral; HISTOLOGY, MORPHOLOGY

695 Meshkova, L.V. 1988. **Results on study of the gypsy moth in the Ukraine.** In: Neparnyy shelkopryad: itogi i prespektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 24-25.
-- An analysis of data on population dynamics in the Ukraine during many years showed that the largest area of gypsy moth foci occurred in 1948-1952. After that the pest either produced local foci or occurred in conjunction with other phyllophages, mostly the green oakleaf roller. Forests belonging to collective farms, ravine forests, and shelter belts served as gypsy moth reservations. The pest population recovered 2 to 3 years after being treated with pesticides and bacterial preparations, but the entomophage population was suppressed either by pesticides or loss of food objects that had been destroyed with bacterial preparations. Application of the preparation virin-ENSh causes a gradual decrease of the pest population while preserving natural enemies. The distribution of egg masses, larvae, and pupae in the population was expressed by the coupling equation of depression, which served as a basis for inventories at different density levels.
EWest; CHEMICAL PESTICIDES, MICROBIAL PESTICIDES, POPULATION DYNAMICS, VIRUS

696 Meshkova, V.L. 1979. **Virus epizooty in gypsy moth population after terrestrial treatment with virus preparation virin-ENSh.** In: Trudy Khar'kovskogo SKhI imeni V.V.Dokuchaeva. Zashchita sel'skokhozyaystvennykh kul'tur ot vrediteley, bolezney i sornyakov. Khar'kov: 29-33.
-- When a virus preparation is introduced into a gypsy moth focus, disease and death occur not only in the treated plot but in plots as far away as 800 m. At a distance of more than 1,300 m, the development of virosis is epizootic and mortality caused by nuclear polyhedrosis is low. As the distance from the treated plot becomes greater, larval mortality decreases considerably. Thus, foci of virus infection should be created at intervals of not more than 800 m.
EWest; FOCI, MICROBIAL PESTICIDES, VIRUS

697 Meshkova, V.L. 1980. **Effect of virus preparation virin-ENSh on a population in lower Dnieper region.** Avtorefereat dissertatsii kandidata biologicheskikh nauk. Leningrad. 16 p.
-- After treatment with Virin-ENSh, an epizootic developed throughout the season in some stages, and the second wave of the epizootic was generated by secondary infection of larvae. To create stable foci, it is necessary to treat 1,500 to 3,000 egg masses in plots not more than 600 to 800 m apart. Leaves should be sprayed against feeding larvae after the majority of eggs have hatched, when instars I and II prevail. Entomophages play an important part in spreading virus infection.
EWest; MICROBIAL PESTICIDES, PARASITES, VIRUS

698 Meshkova, V.L. 1984. **Mathematical modeling of optimum conditions for virus and bacterial preparations when used jointly against gypsy moth larvae.** In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 45.
-- Simultaneous application of the virus preparation virin-ENSh and the bacterial preparation Gomelin produces a synergistic effect. The relation between LT_{50} and gypsy moth larval mortality and the time interval between treatments of larvae with these preparations is given. Dispersion analysis of the data shows simultaneous application to be more effective than consecutive application. The models can be used to forecast the end effect of application and to determine combinations of doses causing high mortality within a short time, given the availability of preparations.
EWest; BIOASSAY, MODELS, VIRUS

699 Meshkova, V.L. 1985. **Effect of virus preparation virin-ENSh on gypsy moth population at low pest density.** Lesovodstvo i agrolesomelioratsiya. 70:54-56.
-- Population dynamics were studied and factors of larval and pupal mortality analyzed in experimental and control plots for two years after application of the preparation virin-ENSh. In the year following application, the pest population kept decreasing from both diseases and higher parasitic activity.
EWest; MICROBIAL PESTICIDES, POPULATION DYNAMICS, VIRUS

700 Meshkova, V.L. 1988. **Improvement of a joint use of virin-ENSh and gomelin against gypsy moth.** Lesovodstvo i agrolesomelioratsiya. 76:44-48.
-- Nomograms were used to chart the relation between mean lethal time and mortality of gypsy moth larvae caused by the joint application of the virus preparation virin-ENSh and the bacterial preparation Gomelin. These charts can be used for forecasting the end effect of particular doses and for determining combinations of doses that cause high pest mortality within a short time

with minimum preparation and expenditure of money.
EWest; MICROBIAL PESTICIDES, MODELS, VIRUS

701 Meshkova, V.L., Gamayunova, S.G. 1981.
Effect of a virus preparation virin-ENSh on parasites of *Lymantria dispar* in the lower Dnieper river basin.
Lesovodstvo i agroleso-melioratsiya. 61:26-30.
EWest; PARASITES, MICROBIAL PESTICIDES, VIRUS

702 Meyer, N.F. 1937.
Biological control of the gypsy moth and browntail moth. In: Biologicheskiy metod bor'by s vrednymi nasekomymi. OGIZ, Leningrad: 48-65.
-- A history of the use of parasites and predators of the gypsy moth in the USA and Europe from 1905 to the mid-1930s. Of 56 species of ichneumons and tachinids registered by that time in Europe as entomophages of the gypsy moth, 31 species were imported to the USA; of 42 parasite species of the browntail, 25 species were imported. As a result of studying their ecology and effectiveness, the following natural enemies were acclimatized in the USA: egg parasites - *Anastatus disparis, Schedius kuwanae*; tachinids - *Compsilura concinnata, Sturmia scutellata*; the chalcid parasite of pupae *Monodontomerus aereus*; and the predator *Calosoma sycophanta*. Effective biological control of the gypsy moth is possible in the former USSR. The procedure of laboratory rearing of some parasites is given.
ECentral; BIOLOGICAL CONTROL, PARASITES, REARING, REVIEW

703 Meyngard, A.A. 1909.
On lepidopterous fauna of Siberia. Russkoe entomologicheskoe obozreniye. (1-2):150-165.
-- During an outbreak in 1903, gypsy moth adults were much larger than European counterparts (females were up to 68 mm in length, with brownish wings having almost no pattern). Females were observed flying across the Yenisey River in warm, calm weather and, unlike the European insects, they oviposited in the foothills and on mountain slopes, on rocks and under stones.
WSiberia; FEMALES, FLIGHT, MORPHOLOGY, OVIPOSITION SITE

704 Meyngard, A.A. 1912.
Review of entomological collections sampled in Western Sayany and in Yenisei river basin on August 6 - September 8 in 1903. In: Izvestiya Tomskogo obshchestva estestvoispytateley i vrachey. Tomsk: 12.
WSiberia; FAUNAL LIST, STAND COMPOSITION

705 Michalache, G. 1989.
Test of preparations for control of folivorous forest pests of Romania. In: Biologicheskaya i integrirovannaya bor'ba s vreditelyami v lesnykh biotsenozakh. Materialy simpoziuma, Borzhomi, 1989. Moscow: 127-133.
-- Bacterial preparations based on *Bacillus thuringiensis*, Thuringin (three preparations produced in Romania), and Dipel (two preparations produced in the USA) were applied against larvae of the gypsy moth, oak leaf roller, and tent caterpillar by aerial spraying of oak stands with ultra-small volumes. Natural and technological factors influencing the efficacy of bacterial preparations are discussed. Instars I to III possess the highest susceptibility to the preparations.
EWest; AERIAL SPRAYING, BACTERIA, GROWTH REGULATORS, MICROBIAL PESTICIDES

706 Milyanovskiy, Ye.S. 1956.
The lepidopterous fauna in Abkhazia. In: Trudy instituta zoologii AN Gruzinskoy SSR. Tbilisi: 51-110.
-- Data on 605 lepidopterous species of 27 families, the gypsy moth included, are given. In Abkhazia gypsy moth adults fly from July to October; their emergence is prolonged due to the prolonged period of larval development. Intersexes occur frequently. Larvae can feed on different species, but mostly they attack young apple trees. In some years many adults were observed in oak groves, but larvae did not attack oaks.
Caucasus; GENETICS, HOST PLANTS, PEST LIST, PHENOLOGY

707 Minyaeva, T.L., Galetov, V.A. 1979.
Tests of biological activity of a disparlure against the gyspy moth. In: Itogi i perspectivy nauchnykh issledovaniy v oblasti lesnogo khozyaystva. Tezisy dokladov Vsesoyuznogo nauchno-tekhnicheskogo soveshchaniya. Pushkino: 78-81.
-- In Moscow Province, three types of disparlure produced at the Shchyolkov Branch of VNIIASZR were tested, each at four concentrations: 0.05, 0.5, 5.0, and 50.0 mkg per trap. Also tested was a polymer attractant containing 0.5 and 5.0 mkg of disparlure. The dose of 50.0 mkg per trap proved to be the most effective, although it is somewhat higher than doses needed for attracting the gypsy moth. In mixed stands where visual inspection did not reveal the insects, traps for nun moth control captured from two to 36 adults. The experiments proved high biological activity of disparlure for the nun moth and suggested its practical application in forest management.
ECentral; PHEROMONE TRAPS

708 Minyailo, B.A., Kovalev, B.G., Bednyy, V.D. 1978.
On specificity of the gypsy moth and the nun moth attractants. In: Khemoretseptsiya nasekomykh. Vilnius: 97-101.
-- A synthetic analogue of disparlure, 2-methyl- cis-6.7-epixyheptadecan, was as attractive for the nun moth as disparlure (Altai Krai, July-August 1973), while for the gypsy moth its attractiveness was low (Moldavia, late July-early August 1974). In nature this substance at levels up to 10 mkg did not attract gypsy moth males, and in a laboratory test it was 5 orders of magnitude less effective than disparlure; it was necessary to take 10 times less of this substance than of disparlure to obtain the same amplitude of electroantennograms. It is suggested that 2-methyl-cis-6.7-epixyheptadecan be used together with disparlure in the nun moth sex attractant, making it specific.
EWest, WSiberia; BIOASSAY, PHEROMONES

709 Minyailo, V.A., Kovalev, B.G., Kirov, E.I., Minyailo, A.K. 1977.
On attractivity of disparlure, sex pheromone of the

gypsy moth females *Porthetria dispar* L. for the males of *Zanclognatha lunaris* (Lepidoptera). Zoologicheskiy zhurnal. 56(2):309-310.
-- Disparlure, the gypsy moth attractant, had been known to attract nun moth males, but the authors found that Disparlure also is attractive to the noctuid *Zanclognatha lunaris* Scop. Disparlure was placed inside traps made of two veneer sheets joined with studs and covered inside with glue. The traps were hung at a height of about 1.5 m not less than 10 m from each other in a pine forest (Altai Krai). Within 3 days, 38 noctuid males were captured. Their distribution was not random, but depended on disparlure concentration. Species population in the stand was not estimated.
WSiberia; PHEROMONES

710 Mirzoev, J.A., Guseinov, Ye.S. 1973.
Gypsy moth and its control measures at the Yamskaya forest bungalow in Azerbaijan. In: Trudy Azerbaydzhanskogo NII lesnogo khozyaystva i agromelioratsii. Baku: 63-68.
Caucasus; CONTROL

711 Mirzoyan, S.A. 1977.
Dendrophilous insects in the parklands and forests of Armenia. (Dendrofil'nyye nasekomyye lesov i parkov Armenii.) Aistan, Erevan. 453 p.
Caucasus; PEST LIST

712 Mirzoyan, S.A. 1988.
Morphometric parameters of the gypsy moth population in Armenia. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 26-27.
-- In the mountain forests of Armenia, parameters were different not only in different topographical zones but also in different vertical zones. At a height over 2,000 m above sea level, males had 4 instars and females 5 instars; below 1,550 m they had 5 and 6 instars, respectively. Egg hatch occurs 20 to 25 days earlier in the foothills than in the upper zone. But the difference in pupation time and time of imago flight is 5 to 10 days, occurring in late July-early August. Insects of the upper zone are, on the average, smaller than those of the lower zone, though with a wide range of variability values for each sex overlap. Establishing correlations between specific morphometric parameters of insects allows for the exact estimation and forecasting of populations.
Caucasus; GEOGRAPHIC VARIATION, MORPHOMETRICS, PHENOLOGY

713 Mirzoyan, S.A., Akopyan, S.G. 1981.
The gypsy moth survey with pheromone traps in mountain forests of Armenia. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Pushkino: 140-142.
-- Gypsy moth outbreaks have been recorded in Armenia at intervals of 8 to 12 years, lasting 2 to 5 years depending on variations in weather conditions. Pheromone-baited traps are suggested as a simpler monitoring method than counts of egg masses. For long action of the pheromone, a dose of 50 mkg per trap is the best. On slopes more than 10 grades steep, more adults are captured by the traps on the lower parts of the slopes as a result of air convergence, while on gentler slopes and in plain forests the number of captures per trap is proportional to the rate of forest infestation. Results of captures can be used for forecasting and determining focus boundaries, and rates of infestation. In contrast to the Crimea, where 50% defoliation is recorded after 350 or more males were captured by traps in the preceding year, in Armenia heavy defoliation of forests is recorded after capturing 50 males per trap.
Caucasus; MONITORING, NUMERICAL DATA, PHEROMONE TRAPS

714 Mirzoyan, S.A., Kireeva, I.M., Esayan, A.G. 1982.
Ecological and physiological features of the gypsy moth population in Armenia. Biologicheskiy zhurnal Armenii. 35(3):169-178.
-- A summary of results of field and laboratory investigations aimed at establishing ecological and physiological peculiarities of the gypsy moth in the forests of central Armenia. When larvae are reared singly, their morphological and biochemical parameters are similar to those of larvae in low-density foci; when they are reared in groups, their parameters are similar to those of larvae in high-density foci. During an outbreak, larvae of dark color prevail; during a collapse, light ones prevail.
Caucasus; BIOCHEMISTRY, COLOR POLYMORPHISM, DENSITY

715 Mirzoyan, S.A., Kobzar', V.F., Akopyan, S.G., Svatkovskaya, T.V., Esayan, A.G. 1980.
The use of dendrobacillin against gypsy moth in the oak groves of Armenian SSR. Lesnoye khozyaystvo. (10):60-62.
-- Oak groves comprise 34.4% of Armenian forests, mainly in the southern, central, and northeastern parts of the republic. As they are located in the recreation zone biological pest control seems to be the only available option. Efficacy of dendrobacillin and BIP with and without chlorophos was determined and compared with treatment with pure chlorophos in laboratory and field experiments. Gypsy moth foci were also treated from the air with dendrobacillin against instars II and III. The experiments showed high efficacy of biopreparations. To achieve thorough treatment of mountain oak groves, spraying should be done in the spring, with the plane flying at not more than 40 m above the forest canopy.
Caucasus; AERIAL APPLICATION, BACTERIA, MICROBIAL PESTICIDES

716 Mirzoyan, S.S. 1954.
On the question about reproduction of the winter moth, scribler, gypsy moth, and browntail moth in forests of Armenia. Izvestiya Akademii nauk Armyanskoy SSR, biologichekie i sel'skokhozyaistvennyye nauki. 7(1):81-90.
-- The species being studied are common forest and orchard pests in Armenia. The gypsy moth is an outbreak species in the forests of southern Armenia. Foci, usually located in the zone below 1,500 m above sea level, are characterized by small area, dispersal, short duration, and mobility, qualities that can be accounted for by sharp

temperature variations throughout the season (including frequent spring frosts) and diverse ecological conditions.
Caucasus: OUTBREAKS, TEMPERATURE

717 Mirzoyan, V.S., Adzhemyan, L.A. 1988.
Dynamics of main biochemical components in the gypsy moth during post-embryonal development. In: Neparnyy shelkopryad: itogi i perspektivy isselodovaniy. Institut lesa i drevesiny SO AN SSSR. Krasnoyarsk: 14-15.
-- The following biochemical parameters of gypsy moth larvae, pupae, adults, and eggs from mountain forests of Armenia were studied: changes in the content of water, lipids (qualitative and fatty acid composition), glucose, glycogen, and proteins of different fractions (water soluble, salt soluble, alcohol soluble, and alkali soluble). Total lipids of the gypsy moth contain fractions of phospholipids, sterols, diglycerides, free fatty acids, triglycerides, and sterol ethers. As larvae develop, lipids, carbohydrates, and proteins used in metamorphosis are accumulated. Their quantity and quality can be a criterion for determining population condition.
Caucasus; BIOCHEMISTRY

718 Mochul'skiy, V. 1866.
Catalogue of common insects from Japan (in French). [Catalogue des Insectes recus du Japan.] Byulleten' Moskovskogo obshchestva ispytatelei prirody. 39(1):162-200.
-- *Ocneria dispar* L. and *Liparis japonica* Motsch. are mentioned among species common in Japan.
Far East; PEST LIST

719 Modestov, V.V. 1926.
The gypsy moth, *Ocneria dispar* L.(Lymantria). In: Vrediteli lesa i bor'ba s nimi. Moscow: 63-64.
-- The species is briefly described as a polyphagous outbreak pest. Destruction of egg masses is suggested as a control measure.
ECentral; GENERAL BIOLOGY

720 Modestov, V.V. 1941.
Bioecology of the gypsy moth and problems of its silvicultural control in forests of the Crimea. In: Nauchno-metodichekiye zapiski. Glavnoye upravlenie po zapovednikam, zooparkam i zoosadam. Moskva: 143-161.
-- Data on gypsy moth ecology in the Crimea are presented. Pupation and oviposition usually occur at the tree base and in shelters, and sometimes in the crown. Fecundity is from 200 to 1,000 eggs, 300 to 400 eggs on the average. Major food plants are oak and oriental hornbeam. Analogous data are available for other regions; for instance, the same manner of oviposition was recorded in Spain by American scientists.
EWest; FECUNDITY, HOST PLANTS, OVIPOSITION SITE, PUPAE

721 Mokhovikov, S.M. 1989.
Study of genomes for DNA-sequences, homologous genomes corresponding to nuclear polyhedrosis virus in the cabbage moth and the gypsy moth by the method of nucleic acid hybridization. In: Biologicheskiye i tekhnologicheskiye problemy sozdaniya virusnykh preparatov dlya integrirovannoy zashchity rasteniy. Novosibisrk: 36.
-- There are many virus carriers in insect populations. To identify latent virus infections, different methods are used, such as X-ray structural examination of chitin, microscopy, and immunology. To examine the starter culture of the cabbage looper and the gypsy moth, the author chose a method of nucleic acid hybridization that can detect DNA virus in the insect body irrespective of the condition of the virus genome. This method was used to examine total DNA extracted from the larvae of the starter culture. The whole DNA of nuclear polyhedrosis virus that can infect the respective insect species was used as a probe. In all cases the hybridization effect is greater than the nonspecific binding effect, and thus the insect has DNA sequences homologous to DNA viruses attacking it.
WSiberia; CELL CULTURE, GENETICS, VIRUS

722 Mokrezhetsky, S.A., Shchegolev, N.M. 1913.
Destructive insects and plant diseases recorded in Tavricheskyaya district in 1912. (Otchet o deyatel'nosti Gubernskogo entomologa Tavricheskogo zemstva i ego pomoshnika za 1912 god. God XX.) Simferopol. 56 p.
-- During a gypsy moth outbreak in the mountains of Crimea, pest control measures were not needed, as foci collapsed in a year due to the activity of entomophages and diseases. The most active parasites were: Habronotus howardi Mokr, which destroyed up to 75-80% of eggs; the early instar parasites *Apanteles solitarius* Rtzb., *A. fulvipes* Hal., and *Pristomertus vulnerator* Panz.; and the parasites of late instars *Sarcophaga affinis* Fall., *Roeselia antiqua* Merg., and *Scotia saturniae* R.-D. Pest control measures are obligatory in gardens and parks. Egg masses should be scratched off and treated with petroleum, sticky belts should be applied to tree trunks during the period of larval migration, and protective zones should be created around gardens.
EWest; CONTROL, PARASITES

723 Mokrzhetskiy, S.A. 1914.
Report on activities of an entomologist in Tavricheskaya district in 1913, the 21st year of his work. (Otchet o deyatel'nosti Gubernskogo entomologa Tavricheskogo zemstva za 1913 god. God 21.) Simferopol. 13 p.
-- During the 1912 gypsy moth outbreak in the mountain forests of the Crimea, gypsy moth infested up to 5,400 acres in the Sudak Forest. In 1913, the outbreak collapsed naturally, due to activity of entomophages and diseases. The most important entomophages were *Apanteles solitarius* Ratz. and *A. fulvipes* Hal.
EWest; PARASITES

724 Mokrzhetskiy, S.A. 1914.
Destructive insects and fungous diseases recorded in gardens of the Crimea in 1913. Sadovodstvo. (6):458-464.
-- During a gypsy moth outbreak in the Crimea in 1912-1913, large foci were recorded in the Simferopol, Feodosia, and Yalta regions. The following control measures are suggested: treatment of egg masses with

petroleum, cutting of surrounding vegetation to protect orchards and nurseries, and application of sticky belts to tree trunks during the period of egg hatch in March. High activity of parasites and a great number of diseased insects were recorded in the foci. By the end of the generation, the pest population was insignificant, and egg masses deposited by females were small. The forecast for 1914 was favorable.
EWest; CONTROL, PARASITES, PATHOGENS

725 Mokrzhetskiy, S.A. 1914.
Destructive insects and diseases of the plants recorded in Tavricheskaya Province in 1913. (Vrednyye nasokomyye i bolezni rasteniy, nablyudavshiyesya v Tavricheskoy gubernii v techenii 1913 g.) Simferopol. 14 p.
-- The gypsy moth is mentioned as an orchard pest. Pear orchards in the Crimea are rarely attacked by this pest. In mixed apple-pear orchards, pear is more heavily attacked and apple less heavily attacked than in pure stands. A similar phenomenon is observed for beech and oak, beech mixed with oak is more heavily attacked than in pure stands, while oak is less heavily attacked.
EWest; HOST PLANTS, STAND COMPOSITION

726 Mokrzhetskiy, S.A., Bragina, A.P. 1917.
Disappearance of *Lymantria dispar* L. in the Crimea. Zhurnal prikladnoy entomologii. (1):21-22.
EWest; POPULATION FLUCTUATION

727 Molchanov, M.I., Kuteev, F.S., Molchanova, V.A., Kotovskaya, A.P. 1987.
Effect of insecticides from group of synthetic pyrethroids on hemolymph proteins in the gypsy moth larvae. Prikladnaya biokhimiya i microbiologiya. 23(2):253-259.
-- The authors studied the effect of insecticides belonging to the group of synthetic pyrethroids on hemolymph proteins of third instars that survived treatment. Quantitative changes in protein content and qualitative changes in protein components were found. Fractionation of hemolymph proteins in polyacrylamide gel revealed changes in the composition of hemolymph proteins of larvae treated with insecticides at concentrations ranging from 0.000075 to 0.05%. Depending on chemical composition and concentration of insecticides, the protein component of a molecular weight of 229 kDa dropped out of the protein fraction spectrum, the components of molecular weights of 43.17 and 14 kDa sharply decreased, and the component of a molecular weight of 50 kDa increased. A decrease was recorded in the protein content of hemolymph of larvae that survived treatment with cymbush in the gypsy moth gradation focus.
ECentral; BIOCHEMISTRY, CHEMICAL INSECTICIDES, HEMOLYMPH

728 Molchanov, M.I., Kuteev, F.S., Molchanova, V.A., Nikiforov, V.V. 1980.
Effect of phosphorous organic insecticides on hemolymph proteins in gypsy moth larvae. Prikladnaya biokhimiya i microbiologiya. 16(5):741-746.
-- The authors studied the effect of organic phosphorous insecticides on hemolymph proteins of gypsy moth larvae that survived after being treated with pesticides in instars III and IV. Fractionation of hemolymph proteins in polyacrylamide gel revealed changes in the composition of hemolymph proteins of larvae treated with insecticides at concentrations ranging from 0.01 to 0.5%. Pupal weight decreased under the impact of metation and diasinon; the number of eggs per mass was not reduced by the action of metation. The component structure of hemolymph proteins of larvae that survive is regarded as an objective criterion for estimating the efficiency of chemical control.
ECentral; BIOCHEMISTRY, CHEMICAL INSECTICIDES

729 Molchanova, V.A. 1980.
Effect of phosporous organic insecticides on protein component composition in hemolymph of the gypsy moth larvae. In: Zashchita lesa ot vrediteley i bolezney. Moscow: 70-82.
ECentral; CHEMICAL INSECTICIDES, HEMOLYMPH

730 Molchanova, V.A. 1982.
Effect of new insecticides on protein content in hemolymph of gypsy moth larvae. In: Molodyye uchenyye v sovershenstvovanii teorii i praktiki vedeniya lesnogo khozyaystva. Trudy nauchnoy konfemtsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva, Pushkino, 1982. VNIILM, Pushkino: 158-162.
-- The author studied the effects of pyrethroid (decis, ambush, cymbush) and organic phosphorous (actelic) insecticides on protein content in the hemolymph of gypsy moth larvae. Depending on the toxicity and concentration of the insecticides, the content of total proteins in the hemolymph of third instars decreased from 89.4% to 44.4%. Total content of protein in hemolymph of larvae treated with insecticides correlated to pupal weight.
ECentral; BIOCHEMISTRY, CHEMICAL INSECTICIDES, HEMOLYMPH

731 Molchanova, V.A., Kuteev, F.S. 1983.
The study of conditions in gypsy moth foci after treatment with insecticides. In: Molodyye uchenyye k yubileyu instituta. Trudy nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva Gosleskhoza SSSR. VNIILM, Pushkino: 202-205.
-- In Lipetsk Province about 245 ha of oak stands were treated against gypsy moth larvae by low-volume spraying. Application of preparations of ambush, cymbush, and dimilin reduced the pest population by 67 and 98-99%. Two years later, the gypsy moth population remained at a low level (0.07-0.26 egg masses per tree); however, female fecundity increased, and average weight of eggs in a mass was higher than in preceding years. An increase in the oak leaf roller population was observed in treated forest plots. In spring, oak defoliation was 100%.
ECentral; CHEMICAL INSECTICIDES, GROWTH REGULATORS

732 Moravskaya, A.S. 1958.
The gypsy moth - abundant pest of forests and plantations. Priroda. 3:90-93.
-- The gypsy moth is a polyphagous pest that feeds on more than 100 plant species. It prefers oak, beech,

hornbeam, mountain ash, and apple. During an outbreak, the gypsy moth inflicts serious damage on orchards and forests, leading to complete defoliation of trees, weakening and killing them; in orchards it also causes loss of crops for at least two years, the year of defoliation and the following year, as fruit buds are not generated immediately after defoliation. Life stages of the pest and some peculiarities of ecology are described. Fecundity is from a few dozen to 1,500 eggs. Gypsy moth phenology is presented and pest control measures are suggested. Mentioned as entomophages are birds, beetles of the genus *Calosoma*, *Xylodrepa quadripunctata* L., *Malachius viridis* L., dermestid larvae, as well as some hymenopterous and dipterous species.
ECentral; BIRDS, HOST PLANTS, PARASITES, PREDATORS, TREE HEALTH

733 Moravskaya, A.S. 1971.
On biology of *Anastatus disparis* Rusch., an egg parasite of the gypsy moth. In: Zashchita lesa ot vrednykh nasekomykh i bolezney. Vsesoyuznaya nauchno-tekhnicheskaya konferentsiya. Doklady. Moscow: 87-89.
-- In the Tellerman Forest Enterprise, Voronezh Province, the egg parasites *Anastatus* and *Telenomus* were found. As the latter species is very rare, *Anastatus* was studied as a promising entomophage. An additional host of this species in the Tellerman Forest is the insect *Palomena parasina* L. Data are given on phenology, life duration, fecundity, parasitic behavior, and preferred biotopes. The maximum parasitism of gypsy moth eggs in the conditions under study amounted to 50%; the annual mean was 3.6%.
ECentral; EGGS, NUMERICAL DATA, PARASITES

734 Moravskaya, A.S. 1973.
A new additional host, *Anastatus disparis* (Hymenoptera, Eupelmidae), egg parasite of the gypsy moth. Zoologicheskiy zhurnal. 52(1):147-150.
-- *Anastatus disparis* was reared from the eggs of *Palomena prasina* L. in nature and in the laboratory. *A. disparis* has a second, additional generation in *P. prasina* during the year. Both male and female wasps are produced from *P. prasina*.
ECentral; EGGS, PARASITES

735 Moravskaya, A.S. 1973.
Influence of imaginal feeding on fecundity and life duration of adults in *Anastatus disparsis* (Hymenoptera: Eupelmidae), egg parasite of the gypsy moth. Zoologicheskiy zhurnal. 52(12):1809-1814.
-- Adult males and females without access to food lived a maximum of 5 and 7 days, respectively. When fed sugar water the maximum life span was increased to 16 and 32 days, respectively. Females given sugar water and host egg contents lived a maximum of 33 days and the number of mature eggs was 16; if feed only sugar water, the maximum number of mature eggs was 9. In nature, a female can kill up to 24 eggs by pricking them with her ovipositor in order to feed on the egg contents.
ECentral; PARASITES, REARING

736 Moravskaya, A.S. 1975.
***Anastatus* - an egg parasite of the gypsy moth.** Zashchita rasteniy. (12):22.
-- *Anastatus disparis* is of high economic significance among egg parasites of the gypsy moth. Surveys in Tellerman Forests in Voronezh Province show that it can parasitize up to 50% of pest eggs. Life stages of *Anastatus* are described. Adults start emerging 20 to 30 days before gypsy moth adults emerge. *Palomena grasina* is mentioned as an additional host. Parasitized eggs of *Palomena* produce both males and females.
ECentral; EGGS, PARASITES

737 Mukhamedzyanova, F.V. 1976.
On materials about study of nematodes for biological controlling parasitic organisms in plant and animals. In: Bor'ba s invaziynymi boleznyami sel'skokhozyaystvennykh zhivotnykh. Ufa: 46-48.
-- An invasion of the gypsy moth by mermithids was studied in pest foci in the forest-steppe zone of Bashkir PRE- Urals in 1973-1975. Helminths were not found in eggs and first instars. In instars II, III and IV, the extent of invasion was 0.4, 2.4, and 1.8%, respectively. In all cases, invasion intensity did not exceed one specimen. The parasitic stage coincides with the period of active feeding of the host. Postparasitic mermithid larvae emerged from gypsy moth larvae in June, when host larvae were in instars IV to VI. All larvae from which helminths emerged died.
EEast; NEMATODES

738 Mukhamedzyanova, F.V. 1981.
Ecology of soil mermithides relative to forest growth conditions and problems of forest protection against gypsy moth. In: Vozobnovitel'nyye protsessy v gornykh shirokolistvenno-khvoynykh lesakh. Ufa: 79-82.
-- Mermithids cause 25% mortality of the gypsy moth in Bashkir region. In some foci, invasion exceeds 30%. Peculiarities of the distribution of these helminths in the hilly forest area of Ufa Plateau were studied. Investigations were conducted in excavations, since a large part of mermithid ontogeny (both preparasitic and postparasitic stages) occurs in the ground. The distribution of mermithids was studied in different forest types, and correlation was established between humidity of the area and mermithid invasion.
EEast; CLIMATE, NEMATODES

739 Mukhin, V.A. 1972.
On study of predators and parasites of the gypsy moth in Volga-Akhtuba floodplain. In: Voprosy parazitologii zhivotnykh Yugo-Vostoka SSSR. Volgograd: 79-84.
-- Literature on factors causing gypsy moth outbreaks is reviewed. An outbreak was recorded from 1968 to 1971 in the Volga-Akthuba floodplain. The gypsy moth population was largely regulated by dipterans: the tachinid *Blepharipoda scutellata* R.-D., and the sarcophagid *Pseudosarcophaga affinis* F. The dominant species were *Exorista larvarum* L. and *Carcelia bombicivora* R.-D. Larval parasitism ranged from 5.8 to 51%; pupal parasitism amounted to greater than 80%. Other active entomophages were the dermestids *Dermestes erichsoni*

Gylb., *Megatoma undata* L., and *Globicornis marginata* Rk., which killed up to 50% of eggs. Data on ecology of dermestid *Globicornis marginata* Pk. are given based on laboratory and field investigations.
EEast; NUMERICAL DATA, PARASITES, PREDATORS

740 Mukhin, Y.P. 1987.
Entomophages of oak pests and improvement of their efficacy in few-row forest belts. In: Sbornik nauchnykh trudov VNII agrolesomelioratsii. Zashchita agromeliorativnykh nasazhdeniy i stepnykh lesov ot vrediteley i bolezney. Moscow: 65-72.
-- Pests and their entomophages were studied in oak groves in Volgograd Province from 1974 to 1979. The most important pests were the green oak leaf roller, the gypsy moth, and the tent caterpillar. Eighteen entomophagous species of different families parasitized the gypsy moth. Parasites caused 5 to 8% of the mortality in the pest population. Accumulation of parasites occurs when mixed forest stands are created, for instance, when poplar is introduced into oak-birch stands. Abundant species of predators (lady beetles, carabids) also were of some importance in decreasing the pest population. Under favorable conditions, the percentage of parasitism by entomophages becomes higher.
ECentral; FAUNAL LIST, PARASITES, PREDATORS, STAND COMPOSITION

741 Nakonechniy, V.I. 1967.
Principles of beneficial usage of biological features of Tachina flies and predacous flesh flies in the control of forest pests. In: Itogi izucheniya lesov Dal'nego Vostoka. Vladivostok: 279-281.
Far East; BIOLOGICAL CONTROL, PARASITES

742 Nakonechniy, V.I. 1971.
Trophic connections of entomophagous Tachina flies with nectar-bearing plants. In: Zashchita lesa ot vrednykh nasekomykh i bolezney. Doklady Vsesoyuznoy konferentsii. Moscow: 136-138.
Far East; ECOLOGY, PARASITES

743 Nakonechniy, V.I. 1973.
Importance of dipterous entomophages at various gradation stages of dendrophilous lepidopterans. In: Entomologicheskiye issledovaniya na Dal'nem Vostoke. Dal'NIILKh, Khabarovsk: 117-125.
-- Dipterous entomophages were studied in the forests of the Far East in 1957-1959 and 1966-1968 under different conditions and in different states of lepidopteran populations. Complexes of parasitic and predatory flies, primarily tachinids and sarcophagids, were distinguished: 34 parasites and predators of the gypsy moth, 22 of the buff tip moth, 20 of the tussock moth, and 15 of the vaporer moth. The rate of parasitism of the gypsy moth by tachinids ranged from 21.3 to 25.4%; sarcophagids destroyed up to 70-85% of the pupae. The dominant species were the oligo- and polyphages: *Carcelia tibialis* R.-D., *Exorista fasciata* Fall., *E. larvarum* L., *Blepharipoda (Sturmia) scutellata* R.-D., Masicera zimini Kol., *Lynnaemyia retroflexa* Pand., *Peletieria* sp., *Kramerea schutzei* Kram., *Parasarcophaga pseudoscoparia* Kram., *P. uliginosa* Kram., and *P. albiceps* Mg. In some cases, joint activity of dipterous parasites can suppress pest outbreaks and sustain their populations at a low level over a long period.
Far East; PARASITES

744 Nakrokhina, O.I. 1978.
Effect of arboricides containing 2,4-D on grazing of leaves by forest insects. In: Ekologiya pitaniya lesnykh zhivotnykh. Nauka, Novosibirsk: 96-107.
-- Feeding of gypsy moth larvae is intensified just after contact. Higher poison doses (2.0, 3.0, and 4.0 kg/ha) cause higher activity in food consumption. Treating foliage with 8 kg/ha has an inhibitory effect on larvae.
WSiberia; CHEMICAL INSECTICIDES, FEEDING

745 Naumenko, A.T. 1975.
Stationary depression of the gypsy moth in oak groves of Moldavia. In: Lesa Moldavii i khozyaystvo v nikh. Kishinev: 66-67.
EWest; POPULATION QUALITY, TREE GROWTH

746 Naumenko, A.T., Kovalev, B.G. 1974.
Use of the gypsy moth sex attractant. In: Entomofagi i microorganizmy v zashchite rasteniy. Byulleten' nauchno-tekhnichekoy informatsii. Kishinev: 58-59.
-- A disparlure preparation tested in the field proved to be highly active at doses of 0.005 - 5.0 mkg per trap. Mating periodicity studies in Moldavia established two peaks of male activity: from 9:30 a.m to 1 p.m., and from 5 p.m. to 7 p.m. Experiments were carried out in plots with low density (0.017 egg masses per tree), medium density (0.3 egg masses per tree), and high density (3.9 egg masses per tree). At high population density, flight lasted 20 to 25 days; at low density it lasted 13 to 17 days.
EWest; DENSITY, EGG MASSES, MATING, PHEROMONE TRAPS

747 Naumenko, A.T., Kovalev, B.G. 1974.
Investigation of possibility to attract the gypsy moth males (*Porthetria dispar* L.) by pheromone traps with disparlure. Zoologicheskiy zhurnal. 53(2):1643-1654.
-- In forest stands with pest populations at different gradation phases, gypsy moth males were attracted to disparlure-baited traps of various types. Disparlure concentrations from 0.005 to 5 mkg of benzene appear to be effective and can be used not only for detection of the pest and numerical counts, but also for behavior control.
ECentral; MATING DISRUPTION, PHEROMONE TRAPS

748 Naumov, P.V. 1958.
Impact of climatic factors on outbreak realization by folivorous forest pests in Ulyanovsk region. In: Uchenyye zapiski Ul'yanovskogo gosudarstvennogo pedagogicheskogo instituta. Ulyanovsk: 108-123.
-- The author studied the role of light, wind, hibernation conditions, and precipitation in the origination and distribution of gypsy moth foci. In Ulyanovsk region, wind is of no importance for the origination of foci, but it transports larvae. Light oak groves are heavily attacked, as the pest is a light-requiring insect. Hibernation conditions and amount of precipitation are thought to