

All Agents

Agent Genus	Agent Species	Order	Family	Weed targeted	Aphis Status	EA?	Sites/ Recommendations	Priority for use	PlntAnimType	Collection Notes	Effectiveness
Aceria	centaureae	Acarina	Eriophyidae	Diffuse knapweed	Not approved	Not approved	Not approved	no use	MITE	Not approved	
Aceria	malherbae	Acarina	Eriophyidae	Field bindweed (may attack Calystegia spp.)	approved, not approved in CA	have APHIS records	Spotty, isolated sites, Unlikely on USFS, doesn't do well in R6 climate, poss on Admin or Grasslands; warm sites; Not approved in CA due to presence of closely related natives (may infest <i>Calystegia</i> spp.).	low priority	MITE	Transfer infested leaves/galls during growing season, early season allows mite populations more time to expand.	Stunts plants, reduces flowering, reduces plant density in Texas.
Aceria	salsolae	Acarina	Eriophyidae	Salsola tragus	approved 8/05	No EA written yet					
Agapeta	zoegana	Lepidoptera	Cochylidae	knapweeds (prefers spotted, also diffuse)	approved	have APHIS records	Widespread in OR, possible gaps; prefers large plants, scattered density, cooler knapweed sites	low priority	INSECT	Adults with blacklights, early July-September, short adult lifespan; or dig roots.	Reduces biomass and density.
Agonopterix	nervosa	Lepidoptera	Oecophoridae	gorse	Not approved	Not approved	Not approved, Accidental	no use	INSECT	Not approved	
Agonopterix	alstroemeriana	Lepidoptera	Oecophoridae	poison hemlock	Not approved	Not approved	Not approved, Accidental	no use	INSECT	Not approved	
Agrilus	hyperici	Coleoptera	Buprestidae	St. Johnswort	approved	mod priority	Spotty in E OR & WA, disperses well; would use on w side if could establish, prefers warm dry large stems; prone to fungus on wet sites; may want to redistribute; found on native H. concinnum in CA, no long term impacts.	mod priority	INSECT	Sweep adults, June-July; release 100 on well-established plants.	Most infested plants die; will attack plants in shade undamaged by <i>Chrysolina hyperici</i> .

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<i>Altica</i>	<i>carduorum</i>	Coleoptera	Chrysomelidae	Canada thistle	Not approved	Not approved	Not currently approved, failed, may attack natives	no use	INSECT	Not approved	
<i>Aphthona</i>	<i>abdominalis</i>	Coleoptera	Chrysomelidae	leafy spurge	approved	not needed	Failed, never recovered in US	no use	INSECT	Not needed	
<i>Aphthona</i>	<i>cyparissiae</i>	Coleoptera	Chrysomelidae	leafy spurge	approved	not needed	Widespread;moist, high humidity and Mediterranean, dry summers with sun, sand, rock; Avoid sites with depressions, N aspects, bare ground; larvae need 4 months cold. Canadian research sug. prefers: flowering plants >51 cm, 50-125 stems/sq m., 40-60% sand.	no use	INSECT	Sweep adults June-July.	Less effective than <i>A.lacertosa</i> ; when <i>Aphthona</i> spp. establish reductions in cover, density, aboveground and root biomass occur in 3-5 yrs.
<i>Aphthona</i>	<i>czwalinae</i>	Coleoptera	Chrysomelidae	leafy spurge	approved	not needed	Widespread; moist, high humidity and Mediterranean, dry summers with sun, sand, rock; larvae need 4 month cold <4 C.	no use	INSECT	Sweep adults June-July.	Less effective than <i>A.lacertosa</i> ; when <i>Aphthona</i> spp. establish reductions in cover, density, aboveground and root biomass occur in 3-5 yrs.
<i>Aphthona</i>	<i>flava</i>	Coleoptera	Chrysomelidae	leafy spurge	approved	not needed	Well distributed, spotty establishment; more mesic than <i>A. cyparissiae</i> or <i>A nigriscutis</i> ; larvae need 4 month cold period; sunny locations.	no use	INSECT	Sweep adults July.	Very effective near Bozeman, little impact in many other sites.

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Aphthona	lacetosa	Coleoptera	Chrysomelidae	leafy spurge	approved	have EA	Widespread; more mesic than other Aphthona spp.;do not redistribute from area where parasitic protozoan Nosema is present	low priority	INSECT	Sweep adults June-July.	Most effective agent on leafy spurge. When it establishes, reductions in cover, density, aboveground and root biomass in 3-5 years. Expected to do well in northern US but not southern.
Aphthona	nigriscutis	Coleoptera	Chrysomelidae	leafy spurge	approved	have APHIS records	Widespread,may want to move within few miles; larvae need 4 month cold period; maximum sun exposure, well-drained, smaller and more scattered spurge, <i>Stipa</i> spp. sites.	low priority	INSECT	Sweep adults June-July.	Particularly effective in Canada.
Aplocera	plagiata	Lepidoptera	Geometridae	St. Johnswort	approved	not needed	Warm and dry with long summers; common in E OR & WA,disperses 50 miles.	no use	INSECT	Sweep larvae in summer, 500 indiv. adequate for release.	Variable; appears to need warm, dry areas with summer long enough to allow two full generations. Effective in BC.
Aulacidea	acroptilonica	Hymenoptera	Cynipidae	Acroptilon repens	approved 2008	Not yet released in OR/WA, ODA will apply for permit 2010, releases planned for summer 2010.	INSECT				
Bangasternus	fausti	Coleoptera	Curculionidae	knapweeds (Diffuse, spotted, and squarrose)	approved	not needed	Widespread, hot & dry, low elev.	no use	INSECT	Transfer adults in the summer.	Can consume up to 100% of seeds in a flower head; attacks other insects in the flower head.
Bangasternus	orientalis	Coleoptera	Curculionidae	yellow starthistle	approved	not needed	Widespread; cool climates unfavorable.	no use	INSECT	Sweep or hand pick in summer.	Single larva destroys 50-60% of seeds in a head.

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Botanophila	seneciella	Diptera	Anthomyiidae	tansy ragwort	approved	not needed	Prefers meadows and openings	no use	INSECT	Sweep adults in early summer, release 50. Transplant infested plants.	Widespread, along with T. jacobaeae and L. jacobaeae tansy ragwort control attributed to these three agents.
Brachyterolus	pulicarius	Coleoptera	Nitidulidae	toadflax	approved	not needed	Accidental, widespread on yellow	no use	INSECT	Collect adult with sweep net or aspirator	Effective in reducing seed production of yellow toadflax.
Bradyrrhoa	gilveolella	Lepidoptera	Pyralidae	Rush skeletonweed	approved	have EA	Recent release, not established; permit issued 5/02.	mod priority	INSECT	Unknown	Can kill aboveground parts, general effectiveness unknown.
Bruchidius	Villosus	Coleoptera	Bruchidae	Scotch broom, French, Spanish, and Portugese	approved	have APHIS records	recent intro, very limited avail in W OR & WA, accid in Carolinas, OR wrote petition & tested in OR & WA	mod priority	INSECT	Collect and redistribute adults after mating, heavy duty sweep nets or beating sheets. Collectible in OR in 2003.	Reduces seed production and may reduce spread.
Calophasia	lunula	Lepidoptera	Noctuidae	toadflax	approved	low, low priority	Not est at high elevations, poss due to cold; warmer sites poss better; does not do well where ant pops high.	low, low priority	INSECT	One to three generations/yr; transfer larvae.	Widespread near Spokane, ineffective, not recovered in OR; strong flier; most common on roadside stands, low density in large stands.
Cassida	rubiginosa	Coleoptera	Chrysomelidae	Canada thistle	Not approved	not needed	Not approved, Accidental, est near Joseph	no use	INSECT	Not approved	
Ceutorhynchus	litura	Coleoptera	Curculionidae	Canada thistle	approved	not needed	Spotty distribution, not demonst effective; may be effective at very high densities where thistle populations are stressed.	no use	INSECT	Collect adults from early spring shoots; release in groups of 30-50.	While it reduces overwintering survival of C. thistle, surviving plants provide source for reinfestation. Needs augmentation with another agent.

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Chaetorellia	acrolphi	Diptera	Tephritidae	knapweeds (spotted preferred, also diffuse, squarrose, purple starthistle, C. leucophaea, and C. vallesiaca)	approved	have APHIS records	Spotty distribution, Lane Co, Hood R.; moist habitats in OR; dry, south-facing slopes, scattered plants in Brit.Col.	high priority	INSECT	Clip larvae-infested seed heads in fall or early spring; best to rear adults and separate from other emerging insects, esp predators.	Establishment in some areas difficult due to competition with seed head weevils and moths.
Chaetorellia	australis	Diptera	Tephritidae	yellow starthistle	approved	not needed	Widespread, spread 50mi/yr; apparently requires C. cyanus in same area for first generation that emerges prior to C. solstitialis availability.	no use	INSECT	Sweep adults or collect infested seed heads in late winter and place in new area in spring.	Larval feeding reduces seed production 80-90%.
Chaetorellia	succinia	Diptera	Tephritidae	yellow starthistle	Not approved	not needed	Not approved, Accidental, spreads well on own.	no use	INSECT	Not recommended	Appears more effective than C. australis. Will feed on Centaurea americana, a native.
Chamaesphecia	crassicornis	Lepidoptera	Sessiidae	leafy spurge	approved	EA avail in Sidney, MT	5 sp.failed in US, not avail.	no use	INSECT	Unknown	Unknown.
Chamaesphecia	hungarica	Lepidoptera	Sessiidae	leafy spurge	approved	have EA	not yet established, possible future introductions.	mod priority	INSECT	Unknown	May be effective in moist sites.
Cheilosia	corydon	Diptera	Syrphidae	Italian thistle, slenderflower thistle, musk, plumeless	approved	?	Prefers larger slenderflower thistle, Widespread in Douglas Co OR	?	INSECT	Sweep adults in early spring (March-April) or dig roots in fall. Early emergence may limit range due to absence of flowers.	Available for collection in 2003. Effectiveness unk. Suitable on nontarget natives in lab, in open field, no egg-laying on natives.

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Chrysolina	hyperici	Coleoptera	Chrysomelidae	St. Johnswort	approved	not needed	Widespread in mesic; cool moist summers, cold winter w/o snow; does not do well in shade.	no use	INSECT	Sweep adults early to mid June, release 250+.	Variable; more effective in CA and w OR than ID and WA.
Chrysolina	quadrigemina	Coleoptera	Chrysomelidae	St. Johnswort	approved	not needed	Widespread in dry; dry summers, mild, moist winters; best in CA climate.	no use	INSECT	Sweep adults from early flowers, early to mid June, release 250+. Late summer pops female and will not breed w/o males.	Variable, most effective in CA where it was responsible for the weed's removal from the noxious weed list.
Chrysolina	variens	Coleoptera	Chrysomelidae	St. Johnswort	Not approved	not needed	failed 50 yrs ago, will not be rereleased	no use	INSECT	Not available	unknown.
Coleophora	klimeschiella	Lepidoptera	Coleophoridae	Russian thistle	approved	not needed	Widespread,moves on own	no use	INSECT	Not needed	High parasitism and predation by natives make this ineffective.
Coleophora	parthenica	Lepidoptera	Coleophoridae	Russian thistle	approved	not needed	Widespread,moves on own	no use	INSECT	Not needed	Feeding damage has little effect, also heavily attacked by predators and parasitoids.
Cyphocleonus	achates	Coleoptera	Curculionidae	knapweeds (spotted preferred, also diffuse)	approved	have APHIS records	Prefers lg stems & monoculture stands,well-drained, low, hot, dry, gravel pits	high priority	INSECT	Collect adults Aug-Sept or rear from roots.	Reduces biomass and density.
Cystiphora	schmidti	Diptera	Cecidomyiidae	Rush skeletonweed	approved	not needed	Widespread, most attack in open locations, well-drained soil, <16" annual precip, yrly ave temp >63F.	no use	INSECT	Collect galled stems early July to late September; remove seedheads/flowers, tie stems into teepees, set among uninfested plants.	Native parasitoids greatly diminish effectiveness.

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Dasineura	capsulae	Diptera	Cecidomyiidae	leafy spurge	approved	low priority	Permitted for release in 1991; not yet established due to very high parasitism.	low priority	INSECT	Collect galls with both mature larvae and pupae; fragile flies.	Unknown.
Diorhabda	elongata	Coleoptera	Chrysomelidae	tamarix	approved	have EA	lots of use in E OR when available: Snake and Owyhee River	high priority	INSECT	All stages, nylon mesh sleeves tied on branches may deter predators and dispersal.	Defoliated plants dieback, severe defoliation for 2 years killed some large plants.
Eriophyes	chondrillae	Acarina	Eriophyidae	Rush skeletonweed	approved	not needed	Widespread, disperses well, found on isolated plants; undisturbed, well-drained, south- and west-facing slopes.	no use	MITE	Transfer galled stems July-mid October, success depends on ambient RH, transfer in evening or damp days.	Most effective agent on this weed so far, impact reduced in CA due to predaceous mites.
Eteobalea	intermediella	Lepidoptera	Cosmopterigidae	toadflax	approved	have EA	Released and recovered in MT, unavail yet for redistribution.	mod priority	INSECT	Sweep in late summer.	Unknown.
Eteobalea	serratella	Lepidoptera	Cosmopterigidae	toadflax, yellow	approved	have EA	Released and recovered in MT, unavail yet for redistribution.	mod priority	INSECT	Sweep in late summer.	Unknown.
Eustenopus	Villosus	Coleoptera	Curculionidae	yellow starthistle	approved	have EA	Widespread, spreads well, if site w/o, FS should put; cool climates unfavorable.	low priority	INSECT	Sweep or hand pick adults in June or July.	Feeding on flower heads and buds can cause 90-100% seed reduction in a head.
Exapion	ulicis	Coleoptera	Apionidae	gorse	approved	not needed	Widespread W OR & WA, all gorse except where gorse and weevil destroyed by fire.	no use	INSECT	Not needed	May retard the spread of the plant but does not reduce established density; 30-95% of seedpods attacked.

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Exapion	fuscirostre	Coleoptera	Apionidae	Scotch broom	approved	low priority	Widespread W OR & WA, mod effect, affect 50% seeds; prefers meadows and hills w/S exposure; damp and cold, N face undesirable.	low priority	INSECT	Adults, April and May; release 100-250 adults.	Reduces seed production up to 60%; stand density reduction is questionable.
Galerucella	calmariensis	Coleoptera	Chrysomelidae	purple loosestrife	approved	have APHIS records	Apparent synergism between two Galerucella spp.: alone G. pusilla density too low for control, G. calmariensis poss limited by dispersal; G. calmariensis attack transfers nutrients to regrowth, which allows G. pusilla to attain high densities. No direct toxic effect of triclopyr amine.	mod priority	INSECT	Small releases tend to remain small, releases of 2000 larvae or adults produce outbreaks. Place larval-infested foliage on plants in the new stand.	Widespread, effective, FS may want; biomass at several sites in Oregon and Washington has been reduced by 90%.
Galerucella	pusilla	Coleoptera	Chrysomelidae	purple loosestrife	approved	have APHIS records	As above.	mod priority	INSECT	Releases of 2000 produce outbreaks. Place larval-infested foliage on plants in the new stand.	Widespread, effective, FS may want; biomass at several sites in Oregon and Washington has been reduced by 90%.
Gymnetron	tetrum	Coleoptera	Curculionidae	common mullein	Not approved	not needed	Not approved, Accidental	no use	INSECT	Not approved	

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Gymnetron	antirrhini	Coleoptera	Curculionidae	toadflax	approved	have APHIS records	biotype approved intro in WA & MT, may want to spread but generally common; does not withstand extreme winter cold; avoid releasing where flower feeding beetle (B. pulicarius) is abundant.	mod priority	INSECT	Sweep adults in July and August.	40-60% infested seed heads, limited effect on stand density
Gymnetron	linariae	Coleoptera	Curculionidae	toadflax, Dalmatian	approved	have EA	Recent release, not established	mod priority	INSECT	Sweep or hand pick in summer.	Unknown.
Hyles	euphorbiae	Lepidoptera	Sphingidae	leafy spurge	approved	not needed	Numerous intros Failed, unlikely to be introduced; warm summers, mild winters.	no use	INSECT	Hand pick larvae summer to fall, release 500+ on warm, rocky, sandy sites.	Defoliates in midsummer and spurge later refoiliates; limited by virus in U.S.
Hylobius	transversovittatus	Coleoptera	Curculionidae	purple loosestrife, <i>L. alatum</i> also used during testing but use in field unknown.	approved	have APHIS records	Spotty, expensive to rear and collect; stands with Galerucella may be unsuitable.	low priority	INSECT	Cut path through infested stand, collect adults with flashlight for 2 hours after sunset along path. Weevils drop when disturbed. Release 25 at sites with large plants.	Feeds on root storage reserves, believed to complement leaf beetle damage.
Jaapiella	ivannikova	Diptera	Cecidomyiidae	Acroptilon repens	approved	have EA 2009	not recovered from WY yet in 2008				
Larinus	planus	Coleoptera	Curculionidae	Canada thistle	Not approved	not needed	Not approved, Accidental, known on <i>Cirsium calolepsis</i> on Wside	no use	INSECT	Not approved	

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Larinus	minutus	Coleoptera	Curculionidae	knapweeds (diffuse, meadow, spotted, squarrose, C. arenaria, and Calcitrapa spp.)	approved	have APHIS records	Widespread, may want to move within few miles; hot, dry areas.	low priority	INSECT	Adult sweep net, hand pick, aspirate in early summer	Heavy defoliation can result in stunting and death; larvae consume entire flower head contents. Dramatic reductions in MT, OR & WA.
Larinus	obtusus	Coleoptera	Curculionidae	knapweeds (spotted and meadow, occ diffuse)	approved	have APHIS records	Limited distribution, priority on meadow in E OR; prefers spotted knap.; prefers slightly moist sites.	high priority	INSECT	Move larvae and pupae in seed heads in late July-early August, or sweep adults during flowering.	Defoliation and seed feeding; populations increase slowly.
Larinus	curtus	Coleoptera	Curculionidae	yellow starthistle	approved	have APHIS records	Widespread in E OR & WA, does poorly on westside, may need redistribution in spots in E; cool climates unfavorable.	low priority	INSECT	Sweep or hand pick adults at 10% bloom, late June to early August.	Larval feeding can reduce seed production by 100%.
Leucoptera	spartifoliella	Lepidoptera	Lyonetiidae	Scotch broom	approved	not needed	Widespread	no use	INSECT	Not recommended	Host density changes not documented; heavily parasitized in OR & WA, may increase susceptibility to pathogens.
Longitarsus	jacobaeae	Coleoptera	Chrysomelidae	tansy ragwort	approved	not needed	Sunny pastures below 800 meters, survives cold where snow keeps ground from freezing deeply.	no use	INSECT	Collect adults with vacuum from infested rosettes after first fall rains; sweep net bolted plants; transfer 100-500.	Widespread; one of three agents attributed with ragwort control in OR.

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Mecinus	janthinus	Coleoptera	Curculionidae	toadflax	approved	have EA	Limited distribution, priority E OR; hot, dry forest and grassland, large stemmed plants; overwinter survival best in s BC or snow-cover.	high priority	INSECT	Light sweep net in May to July, earlier better; release 200.	Sig plant density reduction in BC and WA.
Metzneria	paucipunctella	Lepidoptera	Gelichiidae	knapweeds (spotted preferred, also diffuse and meadow)	approved	not needed	Widespread; does not tolerate severe winters; bulk storage attracts predatory mites.	no use	INSECT	Clip larvae-infested seed heads late summer, early fall, early spring. Seed heads often infested with straw itch mites which attack biocontrols and cause severe human itching.	Although larvae destroy other agents in seed heads, greatest reduction in seed production occurs when moth and gall flies are all present. Deer mice cause heavy overwinter mortality.
Microlarinus	lareynii	Coleoptera	Curculionidae	puncturevine, also attacks Tribulus cistoides and some Kallstroemia spp.	approved	not needed	Isolated sites, limited by cold winter temps., low elev good; can use inundative in other areas.	low elev	INSECT	Collect adults from soil litter with vacuum or aspirator or put plants and litter in bag in sun and collect crawling adults.	Very effective in warm climates.
Microlarinus	lypriformis	Coleoptera	Curculionidae	puncturevine, also T. cistoides and some Kallstroemia spp.	approved	not needed	Same as above.	no use	INSECT	Collect adults from soil litter, same as above.	Very effective in warm climates.
Nanophyes	brevis	Coleoptera	Curculionidae	purple loosestrife	Not approved	have EA	Not introduced in US, all females contaminated with parasitic nematode, no current plans for introduction in US	no use	INSECT	Not approved	

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Nanophyes	marmoratus	Coleoptera	Curculionidae	purple loosestrife	approved	have EA	Sites without prolonged flooding; tolerates wide range of conditions incl. high tidal exchange, low host density; excellent host-finding ability.	low priority	INSECT	Adults with beating tray and beat stick; release 100-200 adults per site.	Widespread, effective, 1000's per plant;
Oberea	erythrocephala	Coleoptera	Cerambycidae	leafy spurge	approved	mod priority	Limited distribution; larvae bore down stem with large pith ≥ 3 mm; warm, well-drained sites.	mod priority	INSECT	Sweep and hand pick adults at peak flowering, release 100+, may need to cage to establish.	Ineffective in western Canada prob due to small pith; attacks only specific biotypes of spurge
Pelochrista	medullana	Lepidoptera	Tortricidae	knapweeds (spotted and diffuse)	approved	have APHIS records	Just released, difficult to establish, not yet available; prefers dry; damage identical to Agapeta.	low priority	INSECT	Collect infested roots in fall, winter or early spring.	Reduces plant biomass.
Phrydiuchis	spilmani	Coleoptera	Curculionidae	Mediterranean sage	Requires reapproval	not needed	Introduction into U.S. failed, unlikely to be reintroduced.	no use	INSECT	Not needed	
Phrydiuchis	tau	Coleoptera	Curculionidae	Mediterranean sage, also clary	approved	low priority	Widespread, may want to move within few miles if Med sage becomes est around John Day; best on warm, dry sites. Attacks clary sage as well but prefers Med sage.	low priority	INSECT	Sweep adults in late spring and early summer when flowers in 25% bloom.	Effective on sites with strong perennial component and little grazing, little effect on salt-desert scrub or annual dominated.

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Prokelisia	marginata	Homoptera	Delphacidae	Spartina anglica, S. alterniflora, S. foliosa	approved	not needed	approved, not nec on FS lands yet; intertidal areas	no use	INSECT	Vacuum or sweep adults and nymphs June-Oct	early results promising for S. alterniflora in Willapa Bay
Psylliodes	chalcomera	Coleoptera	Chrysomelidae	musk thistle, also Italian, plumeless, and Illyrian.	approved	have EA	Approved, but still unavailable, establishment unknown; found in cold and hot areas of Italy.	mod priority	INSECT	Sweep adults.	Unknown.
Pterolonche	inspersa	Lepidoptera	Pterolonchidae	knapweeds (Diffuse, spotted, and squarrose)	approved	not needed	Once established in OR but not recovered since 2000; Mediterranean climate best.	no use	INSECT	Transfer adults, eggs, larvae, or pupae.	Once infested 20% of plants but now undetected due to knapweed reduction from seed head weevils (Larinus spp.).
Puccinia	chondrillina	Uredinales	Pucciniaceae	Rush skeletonweed	approved	not needed	Widespread; most effective in mesic sites, less damaging in hot and dry sites.	no use	FUNGUS	During summer move infected stems and place in cool evening and when dew period anticipated; misting uninfected plants aids infection rate.	Pathotype available has little effect on SW OR late-flwr or NE WA, N ID early-flwr biotypes. In some CA areas considered more effective than mite or midge.
Puccinia	jacea var. solstitialis	Uredinales	Pucciniaceae	yellow starthistle	approved	Established in OR, not yet in WA	FUNGUS	Possibly avail for redistrib 2010.	Recom for sites with seasonal fog.		
Puccinia	canaliculata	Uredinales	Pucciniaceae	yellow nutsedge	Not approved	not needed	not released in US, considered for bioherbicide use	no use	FUNGUS	Not recommended	Unknown.
Pythium	rostratum	Peronosporales	Pythiaceae	knapweed	Not approved	have EA	Not approved	no use	FUNGUS	Not approved	
Rhinocyllus	conicus	Coleoptera	Curculionidae	Canada thistle, Italian thistle	approved	not needed	No longer approved, widespread, no longer used, attacks natives	no use	INSECT	No longer used	

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Selenophoma	juncea	Phialides/ Sphaeropsidales	Phialopycnidiineae/ Sphaeropsidaceae	Scotch broom	Not approved	not needed	Not approved, widespread, no longer used, non-target effects	no use	FUNGUS	Not approved	Suspected of killing plants in late spring.
Sphenoptera	jugoslavica	Coleoptera	Buprestidae	knapweeds (diffuse preferred, also spotted and squarrose)	approved	not needed	Very widespread; warm, dry areas; females need 5 days > 86F to lay eggs.	no use	INSECT	Collect adults with sweep net in mid-July early evening.	Reduces biomass, seed production, and density.
Spurgia	esula	Diptera	Cecidomyiidae	leafy spurge	approved	not needed	Dense spurge, south-facing slopes in cool climates, some shade okay.	no use	INSECT	Clip galls late May to October, release 100+ in dense, well-watered, sheltered spurge sites.	Ineffective, attacked by native species, not likely for USFS; galls on leafy spurge too sparse for much impact.
Subangiuna	picridis	Nematoda	Tylenchidae	Russian knapweed, diffuse knapweed	approved	have APHIS records	nematode, isolated sites, need better dissemination; difficult to establish; does not do well in dry areas, best in misty areas.	low, low priority	NEMATODE	Collect galls in fall and place on soil. Nematodes will emerge from disintegrating galls and move to shoots in wet spring.	Disperses very slowly; some sites now have native grasses but if area too small, weed will reinvade from edges.
Terellia	virens	Diptera	Tephritidae	knapweeds (spotted preferred, also diffuse)	approved	have APHIS records	Prefers spotted knap.; isolated sites, higher elev. than weevils; does not survive well in seedheads with L. minutus, prefers cooler and wetter than weevils.	high priority	INSECT	Collect infested seedheads in fall or early spring; must be kept moist; best to separate out parasitoids.	Reduces seed production; limited availability so effect still not determined.
Tetranychus	linterarius	Acarina	Tetranychidea	gorse	approved	have EA	Widespread W OR & WA, favors unshaded gorse patches away from the ocean.	low priority	MITE	Not needed	Now attacked near Bandon, OR by accid pred mite from greenhouse industry; at many other sites attacked by ladybird beetle and rendered ineffective.

All Agents

Agent Genus	Agent Species	Order	Family	Weed targeted	Aphis Status	EA?	Sites/ Recommendations	Priority for use	PIntAnimType	Collection Notes	Effectiveness
Trichosirocalus	horridus	Coleoptera	Curculionidae	Subtribe Carduinae: musk, plumeless, Italian, Canada, and bull thistles are accepted.	approved, not approved in CA	not needed	Intro everywhere, recovered Klamath R only, not likely for USFS, poss on natives	no use	INSECT	Sweep in July or pick in spring prior to bolt.	Seldom effective by itself. Prohib in CA due to concern for artichokes. Requires 3-5 years to build population. Disperses well.
Tyria	jacobaeae	Lepidoptera	Arctiidae	tansy ragwort	approved	not needed	Widespread, attacks natives (Packara sedaris, S. triangularis) but no pop effect known	no use	INSECT	Not recommended for release into new areas with native untested Senecio and Packera.	Works best in conjunction with L. jacobaeae.
Tyta	luctuosa	Lepidoptera	Noctuidae	Field bindweed (also may attack Calystegia spp.)	approved, not approved in CA	have APHIS records	Recent releases, not established, although moths recovered; unlikely on FS; difficult to establish; recorded to feed on native Calystegia spp.	low, low priority	INSECT	Transfer larvae and adults, can black light; not approved in CA	Does not significantly damage hedge bindweed (Calystegia sepium), effect on field bindweed unk.
Urophora	stylata	Diptera	Tephritidae	bull thistle	approved	not needed	Widespread in W OR with gaps, not survive E OR, while most seeds in an area can be killed, not effective due to recolonization by far-flying seeds; similar initial seed reduction as mowing but mowing allows later flowering when flies not available for seed predation.	no use	INSECT	Collect 20-50 galled seed heads in late fall, keep cool and dry through winter and release newly emerged adults in spring to avoid transferring associated parasites; sweep adults between May and July, transfer 130+ (half female) per release.	Because Bull thistle is transient, it is difficult to maintain fly populations for more than a few years in any location. Flies disperse rapidly.

All Agents

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Urophora	cardui	Diptera	Tephritidae	Canada thistle	approved	not needed	Widespread, may want to move within few miles; does best in scattered, semi-shaded, moist C. thistle stands.	no use	INSECT	Locally may transfer 50-100 galls in spring; otherwise collect galls in fall, winter, early spring, rear adults, separate other insects and release onto misted plants. Collect galls from similar habitats as cold-adapted strains have been developed.	Limited effectiveness; provides metabolic sink that reduces vigor.
Urophora	affinis	Diptera	Tephritidae	knapweeds (spotted, diffuse, squarrose)	approved	not needed	Widespread; Does best in mesic or wetter years; check for presence prior to redistribution.	no use	INSECT	Clip larvae-infested seed heads early spring and fall, sweep adults in June.	Where both <i>Urophora</i> species are present, seed production is reduced at least 50%. <i>Urophora</i> species freq destroyed by seed head moth and weevils.
Urophora	quadrifasciata	Diptera	Tephritidae	knapweeds (black, brown, diffuse, meadow, short-fringed, spotted, squarrose, and cornflower)	approved	not needed	Widespread; Larvae do not tolerate severe winters	no use	INSECT	Clip larvae-infested seed heads early spring and fall, sweep adults June to July.	Where both <i>Urophora</i> species are present, seed production is reduced at least 50%. <i>Urophora</i> species freq destroyed by seed head moth and weevils.
Urophora	solstitialis	Diptera	Tephritidae	Musk thistle and plumeless thistle; In Europe assoc with <i>Carduus</i> spp.	approved	have APHIS records	Recent release in MD, MT, and OR, not established yet in US, difficult to establish.	mod priority	INSECT	Collect thistle heads after galls harden in August-September.	Unknown.

All Agents

Agent Genus	Agent Species	Order	Family	Weed targeted	Aphis Status	EA?	Sites/ Recommendations	Priority for use	PIntAnimType	Collection Notes	Effectiveness
Urophora	sirunaseva	Diptera	Tephritidae	yellow starthistle	approved	not needed	Widespread in western US, SW OR; does not do well in windy areas, not in NE OR; excellent disperser.	no use	INSECT	Sweep adults late May and July.	Rarely exceeds 25% attack rate, effectiveness limited.
Urophora	xanthippe	Diptera	Tephritidae	Russian knapweed	approved 12/03	ODA experimental releases 2010					
Urophora	kasachstanica	Diptera	Tephritidae	Russian knapweed	approved 12/03	ODA experimental releases 2010					
Zeuxidiplosis	giardi	Diptera	Cecidomyiidae	St. Johnswort	approved	not needed	Damp, mod to high humidity, high elevations; not suitable for dry summers or continuous wind.	no use	INSECT	Best to establish plants from new population in pots, infest with midges, then transplant.	many intro in OR failed, est in So CA but para; high RH, does poorly in dry, windy; best in HI.