

## Damage Causal Agent Code Changes August 2015.

This document describes changes to the Damage Causal Agent (DCA) list occurring over the past year. The list was recently reviewed by the National Pathologist and National Entomologist of the Forest Health Protection unit of the U.S. Department of Agriculture, Forest Service. Changes to the list include:

- Addition of new agents
- Retirement of agents (and “non-agents”)
- Reclassification of agents into appropriate categories.
- Corrections to agent names

Following the discussion of list changes is some clarifying discussion regarding declines and complexes

### Changes to Categorization of Agents

Table 1 depicts the old and new categorizations used in the DCA list. Categories undergoing significant changes (those in **bold**) are described in Table 2.

**Table 1. Old and new DCA categories**

Category Code	DCA series	Description old (prior to 2015)	Description new (Current)
10	10000	General Insects	Miscellaneous Insects and Allies
11	11000	Bark Beetles	Bark Beetles
12	12000	Defoliators	Defoliators
13	13000	Chewing Insects	Other Chewing Insects and Allies
14	14000	Sap Feeding Insects	Sap Feeders
15	15000	Boring Insects	Wood Borers
16	16000	Seed/Cone/Flower/Fruit Insects	Seed/Cone/Flower/Fruit Feeders
17	17000	Gallmaker Insects	Gallmakers
18	<b>18000</b>	<b>Insect Predators</b>	<b>Terminal Shoot, Twig, and Root Feeders</b>
19	<b>19000</b>	<b>General Diseases</b>	<b>&lt;Retired&gt;</b>
20	<b>20000</b>	<b>Biotic Damage</b>	<b>Miscellaneous Diseases</b>
21	<b>21000</b>	<b>Root/Butt Diseases</b>	<b>Root Diseases / Decay</b>
22	<b>22000</b>	<b>Stem Decays/Cankers</b>	<b>Cankers</b>
23	23000	Parasitic/Epiphytic Plants	Parasitic Higher Plants
24	<b>24000</b>	<b>Decline Complexes/Dieback/Wilts</b>	<b>Wilts</b>
25	25000	Foliage Diseases	Foliage and Shoot Diseases
26	<b>26000</b>	<b>Stem Rusts</b>	<b>Rusts</b>
27	<b>27000</b>	<b>Broom Rusts</b>	<b>&lt;Retired&gt;</b>
28	<b>28000</b>	<b>Terminal, Shoot, and Twig Insects</b>	<b>&lt;Retired&gt;</b>
29	<b>29000</b>	<b>Root Insects</b>	<b>Declines</b>
30	30000	Fire	Fire
41	41000	Wild Animals	Wild Animals
42	42000	Domestic Animals	Domestic Animals
50	50000	Abiotic Damage	Abiotic Agents
70	70000	Human Activities	Human Activities
71	71000	Harvest	Harvest
80	80000	Multi-Damage (Insect/Disease)	Multi-Agent "Complexes"

Table 2. Description of changes to DCA code list categories

Category Code	DCA series	Old Description (prior to 2015)	Current (New) Description	Notes
18	<b>18000</b>	Insect Predators	<b>Terminal Shoot, Twig, and Root Feeders</b>	Predatory insects moved to <i>miscellaneous</i> category [10000], under subheading 10600
19	<b>19000</b>	General Diseases	<Retired>	Unneeded category
20	<b>20000</b>	Biotic Damage	<b>Miscellaneous Diseases</b>	Category includes bacteria, viruses and other miscellaneous diseases
21	<b>21000</b>	Root/Butt Diseases	<b>Root Diseases / Decay</b>	Category now includes the <i>stem decays</i> from 22000
22	<b>22000</b>	Stem Decays/Cankers	<b>Cankers</b>	Category now contains only cankers
24	<b>24000</b>	Decline Complexes/Dieback/Wilts	<b>Wilts</b>	Category now contains only wilts
25	<b>25000</b>	Foliage Diseases	<b>Foliage and Shoot Diseases</b>	Now only foliage diseases
26	<b>26000</b>	Stem Rusts	<b>Rusts</b>	Stem rusts and broom rusts combined into this one "Rust" category
27	<b>27000</b>	Broom Rusts	<Retired>	Moved to 26000; category now unneeded
28	<b>28000</b>	Terminal, Shoot, and Twig Insects	<Retired>	Terminal insects [27000, 28000] combined and moved to 18000. Category now unneeded.
29	<b>29000</b>	Root Insects	<b>Declines</b>	This new category is for "true" declines. Currently contains 4 declines: <i>Oak Decline, Maple Decline, Yellow Cedar Decline</i> and <i>Sudden Aspen Decline</i>
80	<b>80000</b>	Multi-Damage (Insect/Disease)	<b>Multi-Agent "Complexes"</b>	For multi-agent amalgamations that do not conveniently fit into other categories. Currently contains only <i>root disease and beetle complex</i> and <i>ash yellows</i> .*

\* see discussion on *Declines and Complexes*

### Movement of Agents to Appropriate Categories

Because of the changes to the meaning of categories, some agents needed to be moved into a new DCA number series so that they resided in correct categories. Table 3 provides a listing for the 131 agents that were re-assigned to new DCA codes.

**Table 3. Agents whose DCA code has been re-assigned**

Previous (Old) DCA_Code	New (Current) DCA_Code	Common Name	Scientific Name	New (Current) Category	Old Category
10001	12233	thrips	<Thysanoptera>	Defoliators	General Insects
10002	18006	pine tip moths	<pine tip moths>	Terminal Shoot, Twig, and Root Feeders	General Insects
10004	12224	Chinese rose beetle	<i>Adoretus sinicus</i>	Defoliators	General Insects
10005	12225	rose beetle	<i>Adoretus versutus</i>	Defoliators	General Insects
10006	12226	coconut hispid beetle	<i>Brontispa longissima</i>	Defoliators	General Insects
10007	10601	clerid beetle	<Cleridae>	Miscellaneous Insects and Allies	General Insects
10008	13032	weevil	<Curculionidae>	Other Chewing Insects and Allies	General Insects
10009	12227	green rose chafer	<i>Dichelonyx backi</i>	Defoliators	General Insects
10012	12228	stick insect	<i>Graeffea crouanii</i>	Defoliators	General Insects
10013	12229	<Hulodes caranea>	<i>Hulodes caranea</i>	Defoliators	General Insects
10014	18007	conifer swift moth	<i>Korsheltellus gracilis</i>	Terminal Shoot, Twig, and Root Feeders	General Insects
10015	13033	Caroline shortnosed weevil	<i>Lophothetes spp.</i>	Other Chewing Insects and Allies	General Insects
10016	18008	coconut rhinoceros beetle	<i>Oryctes rhinoceros</i>	Terminal Shoot, Twig, and Root Feeders	General Insects
10017	12230	bagworm moth	<Psychidae>	Defoliators	General Insects
10019	18009	scarab	<Scarabaeidae>	Terminal Shoot, Twig, and Root Feeders	General Insects
10020	14091	ash whitefly	<i>Siphoninus phillyreae</i>	Sap Feeders	General Insects
10021	13034	conifer seedling weevil	<i>Steremnius carinatus</i>	Other Chewing Insects and Allies	General Insects
10023	15106	horntails	<Siricidae>	Wood Borers	General Insects
11051	15107	striped ambrosia beetle	<i>Trypodendron lineatum</i>	Wood Borers	Bark Beetles
11058	15108	redbay ambrosia beetle	<i>Xyleborus glabratus</i>	Wood Borers	Bark Beetles
12027	14094	coconut scale	<i>Aspidiotus destructor</i>	Sap Feeders	Defoliators
12045	14095	leafhopper	<Cicadellidae>	Sap Feeders	Defoliators
12060	16055	spruce coneworm	<i>Dioryctria reniculelloides</i>	Seed/Cone/Flower/Fruit Feeders	Defoliators
12099	10025	blister beetle	<Meloidae>	Miscellaneous Insects and Allies	Defoliators
12118	14096	California tortoiseshell	<i>Nymphalis californica</i>	Sap Feeders	Defoliators
12189	18010	june beetle	<i>Phyllophaga spp.</i>	Terminal Shoot, Twig, and Root Feeders	Defoliators
13004	12231	Palau coconut beetle	<i>Brontispa palauensis</i>	Defoliators	Chewing Insects
13007	10024	Eurytomid wasps	<i>Eurytoma spp.</i>	Miscellaneous Insects and Allies	Chewing Insects
13010	18011	pales weevil	<i>Hylobius pales</i>	Terminal Shoot, Twig, and Root Feeders	Chewing Insects

Previous (Old) DCA_Code	New (Current) DCA_Code	Common Name	Scientific Name	New (Current) Category	Old Category
13012	18012	periodical cicada	<i>Magicicada septendecim</i>	Terminal Shoot, Twig, and Root Feeders	Chewing Insects
13020	18013	northern pitch twig moth	<i>Petrova albicapitana</i>	Terminal Shoot, Twig, and Root Feeders	Chewing Insects
13021	18014	ponderosa pine tip moth	<i>Rhyacionia zozana</i>	Terminal Shoot, Twig, and Root Feeders	Chewing Insects
13025	12232	madrone thrips	<i>Thrips madronii</i>	Defoliators	Chewing Insects
13026	14093	ash plant bug	<i>Tropidosteptes amoenus</i>	Sap Feeders	Chewing Insects
13028	18015	pitch-eating weevil	<i>Pachylobius picivorus</i>	Terminal Shoot, Twig, and Root Feeders	Chewing Insects
13029	18016	eastern pine weevil	<i>Pissodes nemorensis</i>	Terminal Shoot, Twig, and Root Feeders	Chewing Insects
13030	18017	adana tip moth	<i>Rhyacionia adana</i>	Terminal Shoot, Twig, and Root Feeders	Chewing Insects
14041	18018	twig girdler	<i>Oncideres cingulata</i>	Terminal Shoot, Twig, and Root Feeders	Sap Feeding Insects
13006	18039	cicadas	< <i>Cicadidae</i> >	Terminal Shoot, Twig, and Root Feeders	Chewing Insects
15015	18019	cranberry girdler	<i>Chrysoteuchia topiaria</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15020	18020	pine reproduction weevil	<i>Cylindrocopturus eatoni</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15021	18021	Douglas-fir twig weevil	<i>Cylindrocopturus furnissi</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15023	18022	oak twig borers	<i>Anelaphus spp.</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15024	18023	twig pruner	<i>Anelaphus villosus</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15028	18024	eastern pine shoot borer	<i>Eucosma gloriola</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15029	18025	western pine shoot borer	<i>Eucosma sonomana</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15033	18026	pine root collar weevil	<i>Hylobius radialis</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15034	18027	Warren root collar weevil	<i>Hylobius warreni</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15036	14097	tarnished plant bug	<i>Lygus lineolaris</i>	Sap Feeders	Boring Insects
15050	18028	Engelmann spruce weevil	<i>Pissodes strobi</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15051	18029	lodgpole terminal weevil	<i>Pissodes terminalis</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15063	18030	European pine shoot moth	<i>Rhyacionia buoliana</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15064	18031	western pine tip moth	<i>Rhyacionia bushnelli</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15065	18032	Nantucket pine tip moth	<i>Rhyacionia frustrana</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15066	18033	lodgpole pine tip moth	<i>Rhyacionia montana</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15067	18034	southwestern pine tip moth	<i>Rhyacionia neomexicana</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15080	18035	subtropical pine tip moth	<i>Rhyacionia subtropica</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
15083	18036	cottonwood twig borer	<i>Gypsonoma haimbachiana</i>	Terminal Shoot, Twig, and Root Feeders	Boring Insects
18001	10602	lacewings	< <i>lacewings</i> >	Miscellaneous Insects and Allies	Insect Predators
18002	10603	blackbellied clerid	<i>Enoclerus lecontei</i>	Miscellaneous Insects and Allies	Insect Predators
18003	10604	redbellied clerid	<i>Enoclerus spehegeus</i>	Miscellaneous Insects and Allies	Insect Predators
18004	10605	red wood ant	<i>Formica rufa</i>	Miscellaneous Insects and Allies	Insect Predators
18005	10606	western yellowjacket	<i>Vespula pennsylvanica</i>	Miscellaneous Insects and Allies	Insect Predators
20003	23025	love vine, greek kasytas	<i>Cassytha filiformis</i>	Parasitic Higher Plants	Biotic Damage
21024	22090	crown gall	<i>Agrobacterium tumefaciens</i>	Cankers	Root/Butt Diseases

Previous (Old) DCA_Code	New (Current) DCA_Code	Common Name	Scientific Name	New (Current) Category	Old Category
21028	22091	sudden oak death	<i>Phytophthora ramorum</i>	Cankers	Root/Butt Diseases
22001	21039	heart rot	<heart rot>	Root Diseases / Decay	Stem Decays/Cankers
22002	21040	stem rot	<stem rot>	Root Diseases / Decay	Stem Decays/Cankers
22003	21041	sap rot	<sap rot>	Root Diseases / Decay	Stem Decays/Cankers
22005	20005	virus	<virus>	Miscellaneous Diseases	Stem Decays/Cankers
22024	21042	gray brown sap rot	<i>Cryptoporus volvatus</i>	Root Diseases / Decay	Stem Decays/Cankers
22027	21043	red rot	<i>Dichomitus squalens</i>	Root Diseases / Decay	Stem Decays/Cankers
22028	21044	Indian paint fungus	<i>Echinodontium tinctorium</i>	Root Diseases / Decay	Stem Decays/Cankers
22031	21045	Fusarium cortical stem rot	<i>Gibberella avenacea</i>	Root Diseases / Decay	Stem Decays/Cankers
22035	26015	amelanchier rust	<i>Gymnosporangium harknessianum</i>	Rusts	Stem Decays/Cankers
22036	26016	cedar apple rust	<i>Gymnosporangium juniperi-virginianae</i>	Rusts	Stem Decays/Cankers
22039	21046	canker rot of oak	<i>Inonotus hispidus</i>	Root Diseases / Decay	Stem Decays/Cankers
22040	21047	spongy white birch tree rot	<i>Inonotus obliquus</i>	Root Diseases / Decay	Stem Decays/Cankers
22044	21048	ash heart rot	<i>Perenniporia fraxinophila</i>	Root Diseases / Decay	Stem Decays/Cankers
22047	21049	red ring rot	<i>Porodaedalea pini</i>	Root Diseases / Decay	Stem Decays/Cankers
22048	21050	aspen trunk rot	<i>Phellinus tremulae</i>	Root Diseases / Decay	Stem Decays/Cankers
22049	21051	stem decay of black walnut	<i>Phellinus weirianus</i>	Root Diseases / Decay	Stem Decays/Cankers
22062	21052	brown trunk rot / quinine fungus	<i>Laricifomes officinalis</i>	Root Diseases / Decay	Stem Decays/Cankers
22063	21053	wet rot / cellar fungus	<i>Coniophora puteana</i>	Root Diseases / Decay	Stem Decays/Cankers
22064	21054	tinder fungus	<i>Fomes fomentarius</i>	Root Diseases / Decay	Stem Decays/Cankers
22065	21055	purple conk	<i>Trichaptum abietinum</i>	Root Diseases / Decay	Stem Decays/Cankers
22066	21056	pinyon black stain root disease	<i>Leptographium wageneri</i>	Root Diseases / Decay	Stem Decays/Cankers
22067	21057	white trunk rot of conifers	<i>Phellinus hartigii</i>	Root Diseases / Decay	Stem Decays/Cankers
22068	21058	false tinder fungus	<i>Phellinus igniarius</i>	Root Diseases / Decay	Stem Decays/Cankers
22069	21059	robustus conk	<i>Fomitiporia robusta</i>	Root Diseases / Decay	Stem Decays/Cankers
22070	21060	yellow cap fungus	<i>Pholiota alnicola</i>	Root Diseases / Decay	Stem Decays/Cankers
22071	21061	oyster mushroom	<i>Pleurotus ostreatus</i>	Root Diseases / Decay	Stem Decays/Cankers
22072	21062	white ring rot	<i>Physisporinus rivulosus</i>	Root Diseases / Decay	Stem Decays/Cankers
22074	21063	cedar brown pocket rot	<i>Postia serieomollis</i>	Root Diseases / Decay	Stem Decays/Cankers
22079	21064	sterile conk of maple and beech	<i>Inonotus glomeratus</i>	Root Diseases / Decay	Stem Decays/Cankers
22081	21065	birch conk	<i>Piptoporus betulinus</i>	Root Diseases / Decay	Stem Decays/Cankers
22083	21066	red ring rot canker	<i>Porodaedalea cancriformans</i>	Root Diseases / Decay	Stem Decays/Cankers
24001	29001	yellow-cedar decline	<yellow-cedar decline>	Declines	Decline Complexes/Dieback/Wilts

Previous (Old) DCA_Code	New (Current) DCA_Code	Common Name	Scientific Name	New (Current) Category	Old Category
24004	80006	ash yellows	<i>Candidatus phytoplasma fraxini</i>	Multi-Agent "Complexes"	Decline Complexes/Dieback/Wilts
24006	20006	coconut cadang-cadang viroid	<i>CCCVd (246-mecleotide form)</i>	Miscellaneous Diseases	Decline Complexes/Dieback/Wilts
24007	80300	other pest complex, known (code pending)	<other pest complex, known (code pending)>	Multi-Agent "Complexes"	Decline Complexes/Dieback/Wilts
24009	12234	fall hardwood defoliator complex	<fall hardwood defoliator complex>	Defoliators	Decline Complexes/Dieback/Wilts
24013	29003	maple decline	<maple decline>	Declines	Decline Complexes/Dieback/Wilts
24014	29004	oak decline	<oak decline>	Declines	Decline Complexes/Dieback/Wilts
24018	20007	western X-disease phytoplasma	<i>western X-disease phytoplasma</i>	Miscellaneous Diseases	Decline Complexes/Dieback/Wilts
24023	21067	bacterial wetwood	<i>Enterobacter nimipressuralis</i>	Root Diseases / Decay	Decline Complexes/Dieback/Wilts
24026	25081	bacterial leaf scorch	<i>Xylella fastidiosa</i>	Foliage and Shoot Diseases	Decline Complexes/Dieback/Wilts
24030	20008	elm phloem necrosis	<i>Candidatus Phytoplasma ulmi</i>	Miscellaneous Diseases	Decline Complexes/Dieback/Wilts
24032	29002	sudden aspen decline	<sudden aspen decline>	Declines	Decline Complexes/Dieback/Wilts
25007	20009	tobacco mosaic virus	<tobacco mosaic virus>	Miscellaneous Diseases	Foliage Diseases
25008	20010	tobacco ringspot virus	<i>Nepovirus TRSV</i>	Miscellaneous Diseases	Foliage Diseases
25013	26017	large-spored spruce-Labrador tea rust	<i>Chrysomyxa ledicola</i>	Rusts	Foliage Diseases
25015	26018	pine needle rust	<i>Coleosporium asterum</i>	Rusts	Foliage Diseases
25017	26019	Coronado limb rust	<i>Cronartium arizonicum</i>	Rusts	Foliage Diseases
25023	20011	fire blight	<i>Erwinia amylovora</i>	Miscellaneous Diseases	Foliage Diseases
25037	26020	Douglas-fir rust	<i>Melampsora medusae</i>	Rusts	Foliage Diseases
25048	26021	ash rust	<i>Puccinia sparganioides</i>	Rusts	Foliage Diseases
25049	26022	fir and hemlock rusts	<i>Pucciniastrum spp.</i>	Rusts	Foliage Diseases
25058	22092	Diplodia canker	<i>Sphaeropsis sapinea</i>	Cankers	Foliage Diseases
25065	26023	spruce needle rust	<i>Chrysomyxa weirii</i>	Rusts	Foliage Diseases
25066	26024	yellow cypress rust	<i>Gymnosporangium nootkatense</i>	Rusts	Foliage Diseases
25068	26025	leaf rusts of hardwoods	<i>Melampsora spp.</i>	Rusts	Foliage Diseases

Previous (Old) DCA_Code	New (Current) DCA_Code	Common Name	Scientific Name	New (Current) Category	Old Category
25070	26026	hemlock needle rust	<i>Naohidemyces vaccinii</i>	Rusts	Foliage Diseases
25078	26027	Eurasian poplar leaf rust	<i>Melampsora larici-populina</i>	Rusts	Foliage Diseases
25079	26028	'ohia / guava rust	<i>Puccinia psidii</i>	Rusts	Foliage Diseases
27001	26029	spruce broom rust	<i>Chrysomyxa arctostaphyli</i>	Rusts	Broom Rusts
27002	26030	incense-cedar broom rust	<i>Gymnosporangium libocedri</i>	Rusts	Broom Rusts
27003	26031	juniper broom rust	<i>Gymnosporangium nidus-avis</i>	Rusts	Broom Rusts
27004	26032	yellow witches-broom of fir	<i>Melampsorella caryophyllacearum</i>	Rusts	Broom Rusts
28001	18037	pine shoot beetle	<i>Tomicus piniperda</i>	Terminal Shoot, Twig, and Root Feeders	Terminal, Shoot, and Twig Insects
28002	18038	palmetto weevil	<i>Rynchophorus cruentatus</i>	Terminal Shoot, Twig, and Root Feeders	Terminal, Shoot, and Twig Insects

### Retirement of Agents

A number of agents in the list have been retired. Retired codes are no longer available for use, and are not included in published lists of currently valid codes. Note that retired codes are not “reused” in the future, so historical records using a retired code retain their original meaning. (In other words, retired codes are unavailable for use in the future, yet retain their original meaning for use retrospectively.) Table 4 presents all of the DCA code list retirements over the life of the list. Most of the retirements are recent. Recent retirements result from:

- Agents that are not true damage agents but are actually damage types
- Codes that are meant to be used as “headings” only (i.e. the broad-level heading codes)
- Duplicate agents
- Obsolete agents

Since the DCA list is for damage agents, *per se*, damage *types* that heretofore existed in the list (e.g. “forked top”) have been retired. The category headings have been retired: historically they had been used when an agent was unknown. In such cases, the appropriate coding methodology is (and was) to use the -900 series code under each category, e.g. 11900 for “unknown bark beetle” instead of “11000” “bark beetle”. All categories now contain -800 and -900 series codes (for *other <category> known*, or *unknown <category>*, respectively). Category

heading-level codes are no longer available for use as valid DCA codes. Duplicate agents have been retired, as have a few obsolete or never-recorded agents. (Table 4)

**Table 4. Retired DCA agents. The *Alternative Code* field represents how the retired agent should be coded in the future. In most cases, the alternative provided is a perfect substitute (e.g. in the case of duplicates); in other cases it is a suggestion to a more appropriate classification. A “-9999” in the *Alternative Code* field signifies no alternative code is suggested.**

DCA Code	Common Name	Scientific Name	Rationale	Alternative Code
10000	miscellaneous insects and allies	<miscellaneous insects and allies>	Heading	10900
11000	bark beetles	<Scolytinae>	Heading	11900
12000	defoliators	<defoliators>	Heading	12900
13000	other chewing insects and allies	<other chewing insects and allies>	Heading	13900
14000	sap feeders	<sap feeders>	Heading	14900
15000	wood borers	<wood borers>	Heading	15900
16000	seed/cone/flower/fruit feeders	<seed/cone/flower/fruit feeders>	Heading	16900
17000	gallmakers	<gallmakers>	Heading	17900
18000	terminal shoot, twig, and root feeders	<terminal shoot, twig, and root feeders>	Heading	18900
20000	miscellaneous diseases	<miscellaneous diseases>	Heading	90000
21000	root diseases/decay	Root Diseases/Decay	Heading	21900
22000	cankers	<cankers>	Heading	22900
23000	parasitic higher plants	<parasitic higher plants>	Heading	23900
24000	wilts	<wilts>	Heading	24900
25000	foliage and shoot diseases	<foliage and shoot diseases>	Heading	25900
26000	rusts	<rusts>	Heading	26900
29000	declines	<declines>	Heading	90000
30000	fire	<fire>	Heading	30001
41000	wild animals	<wild animals>	Heading	41900
42000	domestic animals	<domestic animals>	Heading	42900
50000	abiotic agents	<abiotic agents>	Heading	50900
70000	human activities	<human activities>	Heading	70100
80000	multi-agent "complexes"	<multi-agent "complexes">	Heading	90000
10018	coconut palm weevil	<i>Rhabdoscelus asperipennis</i>	Duplicate. Use 15061	15061
10022	pyralid moth	<i>Thliptoceras octoquittale</i>	Retired. Never used	-9999
10600	predatory insects and allies	<predatory insects and allies>	Subheading	-9999
11999	western bark beetle complex	<western bark beetle complex>	Retired. Unspecified agents	11900
12063	spruce needleminer	<i>Endothenia albolineana</i>	Duplicate. Use 12150 ( <i>Taniva albolineana</i> ).	12150
12156	willow defoliation	<Tortricidae> [willow defoliation]	Damage type	90000
14047	white pine adelgid	<i>Pineus</i> spp.	Genus-level record. Use the species 14048 ( <i>Pineus strobi</i> ).	14048
16048	coneworm	<i>Hylemia</i> spp.	Obsolete. Possible alternatives include 16045 and 16046.	-9999



DCA Code	Common Name	Scientific Name	Rationale	Alternative Code
17018	gouty pitch midge	<i>Cecidomyia piniinopis</i>	Duplicate. Use 15011	15011
19000	general diseases	<general diseases>	Retired	90000
20004	hemlock fluting	<hemlock fluting>	Damage type	-9999
21018	Phytophthora root rot	<i>Phytophthora cinnamomi</i>	Duplicate: use 21019	21019
21032	retired	<retired>	Never used	-9999
21700	root or butt decay (indicators present)	<root or butt decay (indicators present)>	Duplicate. Use 21900	21900
22004	slime flux	<slime flux>	Duplicate. Use 21067	21067
22059	red belt fungus / brown crumbly rot	<i>Fomitopsis pinicola</i>	Duplicate. Use 21004	21004
22061	sooty bark canker	<i>Phialis singulare</i>	Duplicate: use 22029: <i>Encoelia pruinosa</i> .	22029
22084	Douglas-fir cankers	<Douglas-fir cankers>	Unspecified agent	22900
22700	canker (general)	<canker (general)>	Unspecified. Use 22900	22900
23002	parasitic plants	<parasitic plants>	Unspecified agent. Use 23900	23900
24002	Norfolk Island pine decline	<Norfolk Island pine decline>	Unspecified agent(s); not a true decline	90000
24003	Stillwell's syndrome	<Stillwell's syndrome>	Retired. Obsolete.	-9999
24005	birch dieback	<birch dieback>	Damage type	90000
24008	decline complex	<decline complex>	Unspecified agent(s); not a true decline	90000
24010	joga decline	<joga decline>	Unspecified agent(s); not a true decline	90000
24011	larch decline	<larch decline>	Unspecified agent(s); not a true decline	90000
24012	looper abiotic complex	<looper abiotic complex>	Unspecified agent(s); not a true complex	-9999
24015	pingelap disease	<pingelap disease>	Retired. Obsolete	-9999
24016	sprout dieback	<sprout dieback>	Damage type	90000
24017	true fir pest complex	<>true fir pest complex>	Unspecified agent(s); not a true complex	90000
24027	wetwood	<wetwood>	Duplicate. Use 21067	21067
24028	hemlock decline	<hemlock decline>	Unspecified agent(s); not a true decline	90000
24029	Pacific madrone decline	<Pacific madrone decline>	Unspecified agent(s); not a true decline	90000
25002	broom rust	<none>	Duplicate. Use 26900	26900
25003	juniper blights	<juniper blights>	Duplicate. Use 25001	25001
25053	Rhizopus rot	<i>Rhizopus stolonifer</i> var. <i>stolonifer</i>	Retired. Never used	-9999
25062	Dothistroma needle blight	<i>Dothistroma septospora</i>	Duplicate: use 25040: <i>Mycosphaerella pini</i> .	25040
25064	broom rust	<i>Chrysomyxa arctostaphyli</i>	Duplicate: use 27001	26029
27000	broom rusts	<broom rusts>	Category is retired	26900
27800	other broom rust (known)	<other broom rust (known)>	Category is retired	26800
27900	unknown broom rust	<unknown broom rust>	Category is retired	26900
28000	boring insects - shoot and twig	<boring insects - shoot and twig>	Category is retired	18900
30003	crown fire damage	<crown fire damage>	Redundant	30001
30004	ground fire damage	<ground fire damage>	Redundant	30001
80001	aspen defoliation	<aspen defoliation>	Damage type	90000
80002	subalpine fir mortality complex	<subalpine fir mortality complex>	Unspecified agent(s); not a true complex	90000

DCA Code	Common Name	Scientific Name	Rationale	Alternative Code
80003	five-needle pine decline	<five-needle pine decline>	Unspecified agent(s); not a true decline	90000
80004	pinyon pine mortality	<pinyon pine mortality>	Damage type	90000
90001	broken top	<broken top>	Damage type	90000
90002	dead top	<dead top>	Damage type	90000
90003	limby / wolf tree	<limby / wolf tree>	Damage type	90000
90004	forked top	<forked top>	Damage type	90000
90005	forked below merch top	<forked below merch top>	Damage type	90000
90006	crook or sweep	<crook or sweep>	Damage type	90000
90007	checks, bole cracks	<checks, bole cracks>	Damage type	90000
90008	foliage discoloration	<foliage discoloration>	Damage type	90000
90009	mortality	<mortality>	Damage type	90000
90010	dieback	<dieback>	Damage type	90000
90011	open wound	<open wound>	Damage type	90000
90012	resinosis	<resinosis>	Damage type	90000
90013	broken branches	<broken branches>	Damage type	90000

## New Agents

Thirty three new agents (plus one “sub-heading”) have been added to the DCA list (Table 5)

DCA_Code	Common_Name	Scientific_Name
10600*	predatory insects and allies	<predatory insects and allies>
10800	other miscellaneous insect or ally, known (code pending)	<other miscellaneous insect or ally, known (code pending)>
10801	other predatory insect or ally (known)	<other predatory insect or ally (known)>
10900	unknown miscellaneous insect or ally	<unknown miscellaneous insect or ally>
10901	unknown predator insect or ally	<unknown predator insect or ally>
11067	aspen bark beetle (Trypophloeus)	<i>Trypophloeus populi</i>
11068	aspen bark beetle (Procryphalus)	<i>Procryphalus mucronatus</i>
12235	aroga moth	<i>Araga websteri</i>
12236	aspen twoleaf tier	<i>Enargia decolor</i>
12237	early aspen Leafroller	<i>Pseudexentera oregonana</i>
12238	cottonwood leafblotch miner	<i>Phyllonorycter nipigan</i>
12239	tamarisk leaf beetles	<i>Diorhabda spp.</i>
12240	mountain girdle	<i>Enypia griseatta</i>
12241	box-elder tussock moth	<i>Orgyia leuschneri</i>
12242	spruce budworm (C. orae)	<i>Choristoneura orae</i>
14090	spotted lanternfly	<i>Lycorma delicatula</i>
15105	oak twig pruner	<i>Anelaphus parallelus</i>
15109	eastern poplar buprestid	<i>Poecilota cyanipes</i>
15110	flatheaded poplar borer	<i>Dicerca tenebrica</i>
15111	Mexican goldspotted oak borer	<i>Agrilus coxalis</i>
17024	crypt gall wasp	<i>Callirhytis ceropteroides</i>
18800	other terminal shoot, twig, or root feeder, known (code pending)	<other terminal shoot, twig, or root feeder, known (code pending)>
18900	unknown terminal shoot, twig, or root feeder	<unknown terminal shoot, twig, or root feeder>
21068	artist's conk	<i>Ganoderma applanatum</i>
21069	Phytophthora spp.	<Phytophthora spp.>
22093	eutypella canker of maple	<i>Eutypella parasitica</i>
23800	other parasitic plant, known (code pending)	<other parasitic plant, known (code pending)>
23900	unknown parasitic plant	<unknown parasitic plant>
24034	rapid 'ohia death	<i>Ceratocystis fimbriata</i>
25082	leaf blister of maple	<i>Taphrina carveri</i>
25083	Rhizosphaera needle cast (spp. kalkhoffii)	<i>Rhizosphaera kalkhoffii</i>
25084**	white pine needle damage	<white pine needle damage>
50021	freezing injury to roots	<freezing injury to roots>
50022	salt damage	<salt damage>
70100	other human activities	<other human activities>

\* 10600 is a heading-level code (hence also “retired”) denoting a subcategory under the *Miscellaneous Insects and Allies* category

\*\* 25084 is an amalgamation of specific defoliator agents found in the NA Region, and not a damage type, *per se*.

## Declines and Complexes

### Declines

Our working definition of **decline** comes from ideas presented by Manion (1991):

*a slow, progressive deterioration in health and vigor, primarily affecting a mature cohort of trees, demonstrating decreased growth and increased dieback, and having a complex etiology involving abiotic and biotic factors.*

- Decline symptomology is non-specific and not diagnostic.
- Decline etiology (set of causes) involves:
  - **Predisposing factors:** Long-term. Often climate, site, age, genetic predisposition. May not lead to obvious problems, but predispose trees to:
  - **Inciting factors:** Short-term. Things like defoliation, frost damage, drought. If not for the predisposing factors, trees would recover quickly, but predisposed tree go into decline and are vulnerable to:
  - **Contributing factors:** generally biotic factors such as opportunistic fungi and insects. These finish off the tree, but normally wouldn't do so unless the tree was declining.

*(Above paraphrased from <http://www.forestpathology.org/decline.html>)*

The DCA list is a listing of agents. Although declines are not agents *per se*, we include true declines. Known true declines include:

- Maple decline
- Oak decline
- Sudden aspen decline
- Yellow cedar decline

The above “true” declines are listed in the DCA list

Decline-like syndromes recorded as declines in past surveys include

- Five-needle pine decline
- Hemlock decline
- Larch decline
- Pacific madrone decline

The etiologies for these are, to our knowledge, are either not known, or are known but the disease is not a true decline, but rather a *decline-like syndrome* caused simply from an amalgamation of agents. These should be coded with a DCA code corresponding to the known biotic or abiotic agents involved (if the agents involved are known), or coded with appropriate “unknown” agent codes—e.g. -900 series codes or 90000, (unknown); or with 80300 (other pest complex, known (code pending)) if the disease is a pest complex meeting the requirements discussed in the *Pest Complex* Section, below.

New declines may become evident in the future. Our surveys will help detect them. As their etiologies become elucidated, they will be added to the list of recognized declines.

#### Pest Complexes and Other Multi-agent Amalgamations:

Only a few agent complexes exist as records in the DCA list. In addition to the 4 described below, there exists DCA code 80300 (other pest complex, known (code pending)) available for use in specific circumstances. Note that we conceptually distinguish “true” complexes from other multi-agent assemblages.

- When a complex involves a well-documented, identifiable and consistent suite of organisms and where their relationship(s) amongst themselves is obligatory vis-à-vis their interactions with their host tree(s), then such “true” complexes are included in the DCA list. Currently, one such agent complex exist in the DCA list: 22042: **beech bark disease complex** for use for the “killing front” phase of the disease involving both *Cryptococcus fagisuga* and *Nectria coccinea* var. *faginata*
- **Other multi-agent amalgamations** are in general not included in the DCA list, but there are a few rare exceptions to this rule. If the following conditions are met, then the multi-agent assemblages may be included as a separate record in the DCA code list:
  - the observed syndrome or disease that the assemblage causes is consistently recognizable and attributable to the group; and
  - the component agents of the amalgamation are sufficiently consistent

Meeting both conditions provides evidence that the amalgamation warrants its own code. Currently four such multi-agent records exist in the DCA list:

12234: **fall hardwood defoliator complex**; used in northern parts of Northeastern Areas Region (R9) for a variety of defoliators commonly co-occurring, including: *Heterocampa guttivitta*, *Heterocampa manteo*, other *Heterocampa* spp., *Symmerista canicosta*, *Symmerista leucitys*, *Datana ministra*, and *Dryocampa rubicunda*, and favoring American beech, sugar maple, yellow birch, and paper birch.

25084: **white pine needle damage**; used in northeastern parts of the Northeastern Areas Region (R9) for needle damage in white pine species caused by at least three native, fungal pathogens, usually co-occurring: *Lecanosticta acicola*, *Lophophacidium dooksii*, and *Bifusella linearis*.

80005: **root disease and beetle complex**; for use primarily in R2 for specific instances of root diseases (primarily *Armillaria* spp) working intimately with primarily *Dryocoetes confusus* in Spruce/Fir forest types, frequently in subalpine fir. This code replaces 80002 subalpine fir mortality complex

80006: **ash yellows**; a disease with only partially-known etiology, involving mycoplasma-like organisms: *Candidatus phytoplasma fraxini*, and likely other vectors

Other multi-agent syndromes/complexes should be coded with DCA code 80300 (other pest complex, known (code pending)) **if the complex components are known and the relationships among agents meets criteria outlined above for (at least) other multi-agent amalgamations**. The surveyor should

record the component agents in the Notes field whenever DCA 80300 is used. ***DCA code 90000 should be used in all cases where the agents involved are unknown.***