

**Alien** invasive  
species damage parks, food  
crops, recreational lands,  
waterways, and more...

...and day by day  
they get  
**closer.**



# Alien invasive species damage parks, food crops, recreational lands, waterways, and more...and day by day they get closer.





Species which are non-native (invasive or alien) to Montana interfere and often destroy native plants, wildlife habitat, forests, livestock, waterways, and food crops. These species which may not harm the environment in their native area can cause destruction and major problems when introduced to another area. They

are seeking hosts, like you, who will pick them up while you travel. Once they have landed in your area they will start to multiply and will spread disease, eat with a vengeance, and began destroying.

Invasive species may be insects, nematodes, noxious weeds, amphibians, crustaceans, mollusks, mammals, and more! Over the past couple hundred years many plants, insects, and animals have been introduced into the U.S. Not all of them become invasive and push aside native varieties, but when they do become invasive it can be devastating for the environment, economy, and even affect human health.

APHIS, the U.S. Department of Agriculture's Animal and Plant Health Inspection Service works around the clock, 7 days a week inspect incoming shipments to the U.S. for alien invaders. These aliens use every trick in the book to hitch a ride to a new land; some have been spotted for sale on the internet or been brought in as pets. Step 1 is to learn about potential alien invaders for your area. This project has been developed to help you spot aliens invasive species, and to help you to be on the lookout.

Preventing the introduction and establishment of invasive species in a new area is everyone's responsibility. And there are important, simple things that we should all be aware of:

-  Invasive species can easily be transported on living plants or fresh produce such fruit and plants.
-  Many pests can be found in recently killed plant material such as firewood, lumber, and wood packing materials. Avoid long-range movement of these materials to help slow the spread of invasive species.
-  Purchase only certified pest-free nursery stock (like trees and shrubs) whenever possible.
-  Avoid bringing alien species into your area at all costs! (APHIS, 2015)

Report any sightings of invasive species to your local Extension office.

## Recommended companion resources:

APHIS - Leave Hungry Pests Behind <http://www.hungrypests.com/>  
 Play, Clean, Go - Stop Invasive Species In Your Tracks <http://www.playcleango.org/>  
 Invasive and Exotic Species of North America <http://www.invasive.org/>



# Invasive Fruit Pests

2A

Spotted Wing  
Drosophila



Photo: ©Matt Bertone 2014

2B

Japanese  
Beetle



Photo: Roger Schmidt, University of  
Wisconsin-Madison, Bugwood.org

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## Spotted Wing Drosophila

**Class:** Insecta

**Order:** Diptera

**Species:** *Drosophila suzukii* (Matsumura)

The Spotted Wing Drosophila (SWD) is a fruit damaging invader! The SWD fly is small (2 to 3 mm) with bright red eyes, a pale brown thorax, and an abdomen with black horizontal stripes. This Southeast Asian insect primarily affects ripe or ripening fruit of cherry, peach, plum, raspberry, strawberry, apple, grape, blueberry, and persimmon crops. SWD thrives at cooler summer and fall temperature; the same time most berry and fruit crops ripen. This continuous fruit ripening allows SWD's to move from one crop to another, damaging several different varieties of ripening fruit during a single growing season. SWD's reproduce rapidly, with the potential to complete at least 15 generations each year. Within 1 day of females laying their eggs in fruit, SWD larvae hatch to begin feeding inside the fruit. In as little as 2 days, the fruit begins to collapse around the feeding site with "dents" appearing on fruits such as cherries. This allows mold and infestation by secondary pests to create further damage to our fruit crops. SWD larvae are small, white, and cylindrical. Adult SWDs are active in mid-June with eggs being laid in July through August. There are likely two or three generations per growing season. Adult fruit flies overwinter as adults. You can help stop SWD invasion in Montana by reporting any sightings to your local Extension office. For more information and to visit the source link to:

[http://www.aphis.usda.gov/publications/plant\\_health/content/printable\\_version/Drosophila\\_Suzukii.pdf](http://www.aphis.usda.gov/publications/plant_health/content/printable_version/Drosophila_Suzukii.pdf)

<http://www.mtagalert.org/alertDocs/O%27NeillDrosophilaSuzukii.docx.pdf>

<http://spottedwing.org/>

Roger Schmidt, University of Wisconsin-Madison, Bugwood.org



## Japanese Beetle

**Class:** Insecta

**Order:** Coleoptera

**Species:** *Popillia japonica* Newman

bodied beetles with bronze colored outer wings and six small tufts of white hair along the sides and backs of their body under the wing edges. Female JB's mate and lay eggs often over a period of four to six weeks, laying anywhere from 40 to 60 eggs. JB eggs which were generally laid about 3 inches deep in turf hatch and the larvae emerges hungry and looking to devour lawns in our yards, parks, golf courses, and pastures. The JB larvae eat the roots of grasses which keeps the grass from taking up water. This eventually kills the grass and leaves brown dead spots on grasslands. During the winged adults short life span (30 – 45 days) it can travel for miles by flying short distances at a time and invade new areas. The adult JB feeds on foliage of trees, shrubs, and other plants eating the area of the leaf between the stem and veins. JB life stages are egg, pupa, larvae, and adult. You can help stop this invader by reporting any sighting of this metallic green beetle to your local Extension agent. For more information and to visit the source link to:

[http://www.aphis.usda.gov/publications/plant\\_health/content/printable\\_version/jbidcard5-07.pdf](http://www.aphis.usda.gov/publications/plant_health/content/printable_version/jbidcard5-07.pdf)

<http://store.msuxextension.org/publications/YardandGarden/mt201404AG.pdf>



# Invasive Wood-Boring Beetles

3A

Asian  
Longhorned  
Beetle

Photo: USDA APHIS R.  
Anson Eaglin



3B

Emerald  
Ash  
Borer

Photo: USDA APHIS Dr. James E. Zablotny



USDA APHIS R. Anson Eaglin

**Class:** Insecta  
**Order:** Coleoptera  
**Species:** *Anoplophora glabripennis* (Motschulsky)

## Asian Longhorned Beetle

Asian Longhorned Beetles (ALB) are hungry, non-native, chewing invaders that devour trees! They mainly feast on maples but will also attack other shade trees like poplar, willow, birch, mountain ash, and many more. ALB bodies are shiny black in color

with white spots. Their long black antennae are marked with white rings. ALB is a large beetle approximately 2.5 cm or 1 inch long. ALB lifecycles start with females chewing their way into a tree and laying her eggs under the bark of the host tree, one spot at a time she lays up to 100 eggs. After the eggs hatch the larvae (up to 5cm when full grown) chew further into the tree. Finally, after the ALB pupae mature they chew their way out as beetles through a large round exit hole, breed, and the cycle begins again. All of the holes in the tree cause the tree to ooze sap and die. The ALB's can only be controlled by cutting down the infected trees, chipping them into small fragments, and then burning the chips and stump. Asian Longhorned Beetles were first discovered in New York City after likely coming in on a shipment of freight from the ALB's native home of China. These beetles have the potential to destroy shade trees which are very important habitat for other species, the environment, and for your play time! You can help stop this invader by not moving firewood long distances and reporting any sighting of this shiny black and white beetle to your local Extension agent. For more information and to visit the source link to:

[http://www.aphis.usda.gov/publications/plant\\_health/content/printable\\_version/faq\\_alb\\_07.pdf](http://www.aphis.usda.gov/publications/plant_health/content/printable_version/faq_alb_07.pdf)

<http://asianlonghornedbeetle.com/>

<http://www.dontmovefirewood.org/>

USDA APHIS Dr. James E. Zablotny

**Class:** Insecta  
**Order:** Coleoptera  
**Species:** *Agrilus planipennis* (Fairmaire)

## Emerald Ash Borer

Emerald Ash Borers (EAB) are wood boring exotic beetles that destroy ash trees and they are closing in on the western U.S. EABs are metallic emerald green and can have copper, brass, or reddish colored reflections. EAB have small bullet shaped bodies approximately 10 to 13 mm. Ash trees are destroyed by

boring EAB larvae, which hatch from the 50 to 100 eggs females lay in ash tree bark cracks and crevices. The boring larvae tunnel under the bark into sapwood destroying the xylem, which prevents water from traveling up the tree. Since its discovery in the U.S. in 2002 EABs have already destroyed hundreds of millions of ash trees. EABs are believed to have been accidentally introduced from Asia. Many cities in Montana have ash trees lining their city streets and homeowners have planted them for shade trees as well. These beetles have the potential to destroy these trees, which are very important for habitat for other species, the environment, and for your play time! You can help stop this invader by not moving firewood long distances and reporting any sighting of this metallic emerald green beetle to your local Extension agent. For more information and to visit the source link to:

[http://www.aphis.usda.gov/publications/plant\\_health/content/printable\\_version/EAB-GreenMenace-reprint-June09.pdf](http://www.aphis.usda.gov/publications/plant_health/content/printable_version/EAB-GreenMenace-reprint-June09.pdf)

<http://www.emeraldashborer.info/identifyeab.cfm#sthash.Wp7TiNSA.dpbs>

<http://www.dontmovefirewood.org/>



# Invasive Defoliators

4A

European  
Gypsy Moth

Photo: John H. Ghent,  
USDA Forest Service,  
Bugwood.org



4B

Rosy  
Gypsy  
Moth



Photo: USDA APHIS PPQ Archive,  
USDA APHIS PPQ, Bugwood.org



4A

## European Gypsy Moth

**Class:** Insecta

**Order:** Lepidoptera

**Species:** *Lymantria dispar* (L)

European Gypsy Moth (EGM) is a forest destroying ravenous eater! This moth has some distinct characteristics: the female is too heavy to fly; she lays up to 1000 eggs at a time in a sticky mass almost as big as she is; each larva (caterpillar) eats an area of leaves equivalent to the top of your teacher's desk (about

9 sq. ft.)! The EGM larvae have 5 pairs of parallel blue spots starting behind the head followed by 6 pairs of parallel red spots. These larvae defoliate (destroy leaves) hundreds of varieties of trees including aspen, birch, mountain ash, and willow. EGM males are brown with feathered (pectinate) antennae. The white and brown female lays her eggs in the fall; eggs overwinter in protected areas. In the spring the larvae hatch and pupate in late June and July. Predators of the EGM larvae include birds and mammals such as mice, chipmunks, and squirrels. Species of wasps and flies also provide some biological control. Humans can unknowingly transfer the EGM easily as the larvae can drop onto cars and outdoor equipment. Egg masses have been found on trees, limbs, bark, rocks, and structures including buildings, campers, tents, etc. Parts of the eastern U.S. are currently infested. You can help stop European Gypsy Moth invasion in Montana by inspecting recreational vehicles and any outdoor equipment for egg masses before transportation and reporting any sightings to your local Extension office. For more information and to visit the source link to:

[http://sfec.cfans.umn.edu/prod/groups/cfans/@pub/@cfans/@sfec/documents/article/cfans\\_article\\_380545.pdf](http://sfec.cfans.umn.edu/prod/groups/cfans/@pub/@cfans/@sfec/documents/article/cfans_article_380545.pdf)

<http://www.hungrypests.com/the-threat/european-gypsy-moth.php>

APHIS: [European Gypsy Moth](#)



4B

## Rosy Gypsy Moth

**Class:** Insecta

**Order:** Lepidoptera

**Species:** *Lymantria mathura* Moore

Rosy Gypsy Moths (RGM) are native to Asia and are found in many parts of the world including Russia, Japan, China, and India. They pose a high risk of invasion for the western United States. RGM female wingspans are up to 84 mm and males up to 46 mm. Females fly at night and lay egg masses of 150 – 600

eggs on bark and other objects. Up to 1000 of these larvae (caterpillars) can be seen eating leaves on a single tree, which they prefer to do at night too. Tree defoliation from the RGMs over multiple years kills the trees. The RGM larvae have one pair of penicillin (long hair tufts) on the anterior (front) portion of the head and two pairs on their posterior (rear). These larvae defoliate (destroy leaves) hundreds of varieties of trees including apple, cherry, pear, birch, oak, willow, walnut, and others. RGMs are related to other Gypsy Moth species but unlike European Gypsy Moths, the females can fly and spread much faster. You can help stop Rose Gypsy Moth invasion in Montana by reporting any sightings to your local Extension office. For more information and to visit the source link to:

<http://www.forestpests.org/vd/4601.html>

[http://wiki.bugwood.org/Lymantria\\_mathura](http://wiki.bugwood.org/Lymantria_mathura)

<http://www.padii.gov.au/pests-and-diseases/pest/main/136286>





# Invasive Plant Diseases

5A

## Black Stem Rust

Photo: USDA ARS  
Yue Jin

5B

## Late Blight

Photo: USDA-ARS Scott  
Bauer

5C

## Plum Pox Virus

Photo: European and Mediterranean Plant  
Protection Organization Archive, France

USDA ARS Yue Jin

## Black Stem Rust

**Class:** Pucciniomycetes  
**Order:** Pucciniales  
**Species:** *Puccinia graminis* Persoon

Asian Longhorned Beetles (ALB) are hungry, non-Black Stem Rust (BSR) is caused by a parasitic fungus, *Puccinia graminis*, which causes crop damaging pustules to erupt on the stems and leaf sheaths of wheat, oats, rye, barley, and grasses. *P. graminis* must have two entirely different plant species as hosts in order to complete its lifecycle; the barberry and one of the grass plants it destroys. While infecting each of these hosts there are a number of different spores which germinate and are necessary to complete the life cycle. The spores travel between the plants by wind. Removing barberry shrubs from areas near fields is necessary for control; this is difficult because birds spread barberry shrubs after eating their berries. You can help stop Black Stem Rust by avoiding planting susceptible ornamental barberry shrubs and reporting any sightings of BSR to your local Extension office.

For more information and to visit the source link to:

<http://ars.usda.gov/Main/docs.htm?docid=10755>

APHIS: Black Stem Rust

<http://homeguides.sfgate.com/stem-rust-barberry-61114.html>

USDA ARS Scott Bauer

## Late Blight

**Class:** Oomycota  
**Order:** Peronosporales  
**Species:** *Phytophthora infestans*  
(Montagne) de Bary

Late blight of potato and tomato caused by *Phytophthora infestans* is a devastating disease worldwide and led to the Irish potato famine in 1845. Under favorable weather conditions, tomato and potato crops can be destroyed within days. Late blight damages both leaves and tubers of potato crops. Yield losses caused by late blight and the cost of control measures have been estimated to exceed \$6.7 billion dollars annually and the disease is a major threat to food security worldwide. Late blight is present in the western U.S. Scientists employ many tactics to control this invasive disease. You can help stop Late blight by planting certified seed potatoes and reporting any sightings of Late Blight to your local Extension office.

For more information and to visit the source link to:

<http://usablight.org/lateblight>

<http://ohioline.osu.edu/hyg-fact/3000/3102.html>

European and Mediterranean  
Plant Protection Organization Archive, France

## Plum Pox Virus

**Family:** RNA virus, Potyviridae  
**Genus:** *Potyvirus*  
**Species:** Plum Pox Virus

Plum Pox Virus (PPV), a.k.a. Sharka, causes disease in stone fruit crops such as peaches, plums, apricots, nectarines, almonds, sweet and sour cherries, as well as in other selected *Prunus* and non-*Prunus* species worldwide. PPV is a native of Europe and was first detected in Pennsylvania in 1999. PPV has seriously damaged stone fruit crops in some states and could devastate the stone fruit industry of the U.S. as it is the most devastating viral disease of stone fruit in the world. Once infected with PPV the fruit is ruined by discoloration and deformity. The virus can be transmitted to healthy plants by more than 20 different aphid species. PPV is also spread by movement of infected nursery stock. You can help stop Plum Pox Virus by watching for it on fruit trees and reporting any sightings of PPV to your local Extension office.

For more information and to visit the source link to:

APHIS: Plum Pox Plant Protection and Quarantine

<http://pest.ceris.purdue.edu/pest.php?code=FVPPVBE>





# Invasive Nematodes

6A

## Potato Cyst Nematodes



Photo: Ulrich Zunke,  
University of Hamburg,  
Bugwood.org

Photo: Ulrich Zunke,  
University of Hamburg  
Bugwood.org

6B

## Pine Wilt Nematode

Photo: USDA Forest Service - Region 2 -  
Rocky Mountain Region Archive,  
USDA Forest Service,  
Bugwood.org



Photo:  
L.D. Dwinell, USDA  
Forest Service,  
Bugwood.org

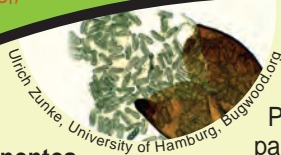
6C

## Cereal Cyst Nematodes

Photo: DAFF Archive, Bugwood.org







Ulrich Zinke, University of Hamburg, Bugwood.org

## Potato Cyst Nematodes

**Class: Secernentea**

**Order: Tylenchida**

**Species: *Globodera* spp.  
(numerous species)**

Potato Cyst Nematodes (PCN) are microscopic roundworms which are parasitic to plants. The PCNs don't actually feed on potato tubers, but rather on the roots which feed the tubers. Female PCNs attach themselves to the roots and stay sedentary there. Females lay up to 200-600 eggs at a time which are contained in cysts. Cysts can lay dormant in the soil for up to 30 years, making control of nematodes difficult. PCNs live in soil and plant tissues, and more than one species may occur in a field. Farmers must use extra caution as soil sticking to farm equipment and harvested potatoes provide the means for this nematode to spread. Tomatoes, eggplant, and other plants in the nightshade family are very susceptible to these parasites. You can help stop the spread of Potato Cyst Nematodes by planting certified potato root stock and reporting any sightings to your local Extension office. For more information and to visit the source link to:

[http://www.aphis.usda.gov/publications/plant\\_health/content/printable\\_version/pa\\_potatocyst.pdf](http://www.aphis.usda.gov/publications/plant_health/content/printable_version/pa_potatocyst.pdf)

<http://www.agri.idaho.gov/Categories/PlantsInsects/PlantDiseasesAndOtherPests/Documents/PCNPestAlert.pdf>

<http://www.inspection.gc.ca/plants/plant-protection/nematodes-other/potato-cyst-nematodes/inspection/eng/1337016451272/1337016555455>



USDA Forest Service - Region 2 - Rocky Mountain Region Archive, USDA Forest Service, Bugwood.org

## Pine Wilt Nematode

**Class: Secernentea**

**Order: Aphelenchida**

**Species: *Bursaphelenchus xylophilus*  
(Steiner & Buhrer) Nickle**

Pine wilt is a pine tree destroying disease that kills affected trees in a very short period of time, less than 3 months. The pine wood nematode (*Bursaphelenchus xylophilus*) which causes affected pine trees to die is microscopic. Most plant-parasitic nematodes are associated with plant roots, but the pine wood nematode is found in aboveground parts of the tree. The nematodes are moved as they hitch a ride with pine sawyer beetles (*Monochamus* spp.), which fly from tree to tree. Many different species of pine trees are susceptible to this disease. The pine wood nematode was found widely distributed in the United States after its rediscovery in a dying tree in 1979. In the United States, the highest incidence of the disease is currently in the Midwest. Worldwide, the problem is epidemic in Japan and other parts of Asia. For more information and to visit the source link to:

[http://www.na.fs.fed.us/spfo/pubs/howtos/ht\\_pinewilt/pinewilt.htm](http://www.na.fs.fed.us/spfo/pubs/howtos/ht_pinewilt/pinewilt.htm)

<http://www.apsnet.org/edcenter/intropp/lessons/Nematodes/Pages/PineWilt.aspx>



DAFF Archive, Bugwood.org

## Cereal Cyst Nematodes

**Class: Secernentea**

**Order: Tylenchida**

**Species: *Heterodera*  
spp. (numerous species)**

Cereal Cyst Nematodes (CCN) are cereal crop destroyers. Plant nematodes are tiny (less than 1mm) roundworms that occur worldwide in nearly all environments. Although many nematodes are beneficial to agriculture because they help crop residue decay and are important members in the food chain, about 15 percent of the species are parasitic to plants and cause massive crop losses. CCNs spread rapidly as they can move on shoes, equipment, plants, and by wind and water. CCNs affect roots of crops causing poor root growth and stunting. There are several species of cyst nematodes that affect cereal crops worldwide. CCN detection and identification require the services of a professional nematologist. For more information and to visit the source link to:

<http://extension.oregonstate.edu/catalog/html/sr/sr1074-e/05.pdf>



# Invasive Terrestrial Snail

7

Eastern  
Heath Snail



Photo: I. Foley, Montana Department of  
Agriculture, [www.agr.mt.gov](http://www.agr.mt.gov)



I. Foley, Montana Department of Agriculture, www.agr.mt.gov

## Terrestrial Snail

**Class:** Gastropoda

**Order:** Stylommatophora

**Species:** *Xerolenta obvia* (Menke)

The Eastern Heath Snail has white shells marked with dark brown stripes, which attain a maximum height of 16 mm and a diameter of 22 mm, with 5 to 6 whorls. Native species of the same general appearance do not typically climb vegetation and other upright objects, or aggregate in large numbers the

way this species does. This snail is native to Eastern Europe and was recently detected in Montana in southeast Cascade County. This is the first population reported in western North America. The Eastern Heath Snail prefers dry grassy areas and survives long periods of dry conditions by withdrawing into its shell and sealing the opening with a mucous membrane. The snail feeds on a wide range of plants including, alfalfa, clover, lupine, wheat, barley, fruit trees, and weeds. They can be found on vegetation, under rocks, boards, or attached to other hard surfaces including homes and barns. This species is known for climbing on vegetation, fence posts, and other upright objects to escape high temperatures and will aggregate in enormous numbers in a behavior called massing. The species readily attaches to hard surfaces such as rail cars, international, shipping containers, stone and granite tile, and other transportation vehicles used in international trade. The species is regarded as a pest because it has the potential to reduce crop yield and quality, contaminate fruits, vegetables, and hay, and transmit plant and animal diseases. The Montana Department of Agriculture is working with the United States Department of Agriculture Animal Plant Health Inspection Service (APHIS) to determine the extent of the population and possible local origin of this new to Montana pest. Any sightings of suspect snails should be reported to the Montana Department of Agriculture (406-444-9454 or [agr@mt.gov](mailto:agr@mt.gov)), USDA APHIS (406-449-5210), or your local Montana State University county extension office. For more information and to visit the source see:

<http://fieldguide.mt.gov/speciesDetail.aspx?elcode=IMGASE0040>

[http://www.theprairiestar.com/news/crop/eastern-heath-snails-becoming-a-threat/article\\_4ad55c6a-e8bf-11e2-b93b-001a4bcf887a.html](http://www.theprairiestar.com/news/crop/eastern-heath-snails-becoming-a-threat/article_4ad55c6a-e8bf-11e2-b93b-001a4bcf887a.html)



Photos: I. Foley, Montana Department of Agriculture, www.agr.mt.gov





# Invasive Aquatic Snails and Clams

8A

New Zealand  
Mudsnail

Photo: Montana Fish,  
Wildlife & Parks

8B

Asian  
Clam

Photo: Shawn Liston, Audubon of Florida, Bugwood.org

Montana Fish, Wildlife & Parks

**Class:** Gastropoda  
**Order:** Neotainioglossa  
**Species:** *Potamopyrgus antipodarum*

## New Zealand Mudsnail

The New Zealand mudsnail (NZMS) is spread via stocking operations, by recreational anglers, or possibly aquarium release. It reproduces asexually and thus it only takes one to start a new population. It is found in lakes and rivers. The NZMS can out-compete native snails and

other invertebrates and may impact the fishery it is introduced into by reducing food availability. The NZMS can range in size from a grain of sand to 1/8" long. Its color ranges from brownish to bluish-green to black. Its operculum covers the opening of the shell, which is on the left when the point is up. It can close its operculum to avoid desiccation. It has reached densities as high as 500,000 per square meter. You can help stop this invader when you Inspect, Clean and Dry your aquatic equipment and by reporting any sighting to FWP by calling 406-444-2449 or online at <http://fwp.mt.gov/fishing/guide/AIS/aisSighting>. For more information and to visit the source link to:

<http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=1008>



Photo:  
Mohammed El Damir,  
Pest Management,  
Bugwood.org

Shawn Liston, Audubon of Florida, Bugwood.org

**Class:** Bivalvia  
**Order:** Veneroida  
**Species:** *Corbicula fluminea*

## Asian Clam

The Asian clam has spread to 38 states in the U.S. since its introduction in the late 1930s. It is not known to exist in Montana. They spread via bait bucket introduction, accidental introductions associated with imported aquaculture species and intentional introductions by

people who buy them as a food item in markets. Biofouling is thought to be the most prominent effect of their introduction. It is estimated that removing them in the U.S. costs about a billion dollars each year. It can also out-compete native invertebrates for food and space. You can help stop this invader when you Inspect, Clean and Dry your aquatic equipment and by reporting any sighting to FWP by calling 406-444-2449 or online at <http://fwp.mt.gov/fishing/guide/AIS/aisSighting>. For more information and to visit the source link to:

<http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=92>



# Invasive Mollusks

9A

Quagga  
Mussel



Photo: Amy Benson,  
U.S. Geological Survey,  
Bugwood.org

9B

Zebra  
Mussel



Photo: Randy Westbrooks, Invasive Species  
Prevention Specialist, Bugwood.org





**Quagga Mussel**

Amy Benson, U.S. Geological Survey, Bugwood.org



**Zebra Mussel**

Amy Benson, U.S. Geological Survey, Bugwood.org

**Class: Bivalvia**  
**Order: Veneroida**  
**Species: Quagga -**  
***Dreissena bugensis* Andrusov**

## Quagga and Zebra Mussels

**Class: Bivalvia**  
**Order: Veneroida**  
**Species: Zebra -**  
***Dreissena polymorpha***  
**(Pallas)**

These mussels have caused profound ecological changes in freshwater ecosystems where they have become established, including losses of phytoplankton and microzooplankton. These losses in plankton can have cascading effects on the whole ecosystem as plankton is the base of aquatic life. They can cause the mortality of native clams and mussels. They cost municipal and industrial water facilities millions of dollars to control. If introduced into Montana they will likely survive, become established and result in significant environmental and industrial damage. They are transported overland in bilges, livewells, motors, and attached to boats and trailers. Their larval stage is too small to be seen by the naked eye and therefore may be transported unknowingly in what appears to be clean water. Adult mussels can survive out of water for extended periods of time depending on conditions. You can help stop this invader when you Inspect, Clean and Dry your aquatic equipment and by reporting any sighting to FWP by calling 406-444-2449 or online at <http://fwp.mt.gov/fishing/guide/AIS/aisSighting>. For more information and to visit the source link to:

<http://nas.er.usgs.gov/taxgroup/mollusks/zebramussel/>

### Zebra Mussels

Photo: Randy Westbrooks, Invasive Species  
Prevention Specialist, Bugwood.org



# Invasive Crustaceans

10A

Spiny and  
Fishhook  
Waterfleas



Photo: Igor Grigorovitch,  
Bugwood.org

10B

Rusty  
Crayfish



Photo: U.S. Geological Survey Archive, U.S.  
Geological Survey, Bugwood.org



Fishhook Waterflea

Igor Grigorovich, Bugwood.org

## Spiny and Fishhook Waterfleas

**Class:** Branchiopoda

**Order:** Diplostraca

**Species:** Spiny - *Bythotrephes longimanus*

Fishhook - *Cercopagis pengoi*

These predacious crustaceans are small with long, barbed tail spines. They are native to Europe and were introduced into the Great Lakes in the 1980s via ballast water. They spread via overland transport of resting eggs on fishing

gear, in bilge water, and livewells and bait buckets. They compete with juvenile fish for food and foul aquatic gear. Anglers often discover new infestations. Both species collect in masses on fishing lines and downrigger cables. These masses can clog the first eyelet of rods, damage a reel's drag system, and prevent fish from being landed. In certain conditions, eggs can resist drying, remain viable and establish a new population when spread to inland waters. You can help stop this invader when you Inspect, Clean and Dry your aquatic equipment and by reporting any sighting to FWP by calling 406-444-2449 or online at <http://fwp.mt.gov/fishing/guide/AIS/aisSighting>. For more information and to visit the source link to:

Spiny waterflea <http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=162>

Fishhook waterflea <http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=163>



U.S. Geological Survey Archive, U.S. Geological Survey, Bugwood.org

## Rusty Crayfish

The Rusty Crayfish spreads via bait buckets, ballast water, and aquarium dumping. Females can carry fertilized eggs; therefore one female can start a new population. Native crayfish populations have been eliminated by the rusty crayfish through competition and disease. These crayfish

can also cause the destruction of plant bed abundance and diversity. It is a common aquarium crayfish. You can help stop this invader when you Inspect, Clean and Dry your aquatic equipment and by reporting any sighting to FWP by calling 406-444-2449 or online at <http://fwp.mt.gov/fishing/guide/AIS/aisSighting>. For more information and to visit the source link to:

<http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=214>



Photo: U.S. Geological Survey  
Archive, U.S. Geological Survey,  
Bugwood.org

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# Invasive Reptiles and Amphibians

11A

Bullfrog

Photo: Joy Viola, Northeastern  
University, Bugwood.org

11B

Red-Eared  
Slider  
Turtle

Photo: Rebekah D. Wallace, University of Georgia,  
Bugwood.org



Joy Viola, Northeastern University, Bugwood.org

**Class:** Amphibia

**Order:** Anura

**Species:** *Lithobates catesbeianus*

## Bullfrog

American Bullfrogs are voracious feeders and will eat anything smaller than themselves, including ducklings, fish, mice, frogs, and small turtles. They are not native to Montana and have been implicated in the decline of native frogs, turtles, and waterfowl production. Bullfrogs are rarely seen far from the water's edge and are usually in the water of ponds, wetlands and rivers in the valleys. Their loud, deep "jug o'rum" call can

be heard from a considerable distance. Adult Bullfrogs may reach a body length of 8 inches, and are dark green or brownish-green above with dark blotches and a cream underbelly. Bullfrogs do not have ridges along the sides of their back, but do have prominent ridges running from their eyes over their external ear drum to their shoulders. Tadpoles are olive-green above, and cream below, and may grow to 4.5 inches in length. In Montana, Bullfrogs breed during warm weather in June and July. Eggs hatch in about 4 or 5 days. The tadpole stage may last 3 years, but metamorphosis has been observed in early June. Bullfrogs are prohibited species in Montana. You can stop the spread of this species by not purchasing or releasing pet Bullfrogs, and by reporting any field observations to your local Fish, Wildlife & Parks office. For more information and to visit the source link to:

<http://fieldguide.mt.gov/speciesDetail.aspx?elcode=AAABH01070>

Photo: Russ Ottens,  
University of Georgia,  
Bugwood.org



Robert D. Wallace, University of Georgia, Bugwood.org

**Class:** Reptilia

**Order:** Testudines

**Species:** *Trachemys scripta elegans*

## Red-Eared Slider Turtle

Red-eared sliders are a common pond turtle native to southeast U.S. It is familiar looking with a dark green oval shell, green legs and a green head with a red stripe behind its eye. They can grow to 11 inches in shell length, and can live up to 30 years. However, red-eared sliders in the wild of Montana

are invaders, and are likely waifs from pet releases. These turtles seek out quiet waters with plant growth and basking sites, and are quick to "slide" back in to the water if disturbed. Red-eared sliders may be able to outcompete Montana's native Painted turtle, and are listed as one of the world's top 100 invaders. Red-eared sliders eat aquatic plants, crayfish, snails, insects, and carrion. Red-eared sliders are highly aquatic and are rarely found far from water. The female turtle lays 2-23 eggs in holes that they dig in the ground around June, and when the young turtles hatch, they must fend for themselves and head straight to water. Incubation takes up to 80 days. Red-eared sliders are prohibited in Montana, and you can stop the spread of this species by not purchasing or releasing pet Red-eared sliders, and by reporting any field observations to your local Fish, Wildlife & Parks office. For more information and to visit the source link to:

<http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=1261>

Photo: Joy Viola,  
Northeastern University,  
Bugwood.org







# Invasive Fish

12

12

Asian Carp  
(Bighead,  
Black, Grass,  
Silver)



Silver Carp

Photo: Lindsey Lewis, U.S. Fish and Wildlife, Bugwood.org



Silver Carp

Photo: Nate Tessler, EnviroScience, Inc., Bugwood.org





## Asian Carp

**Class:** Actinopterygii

**Order:** Cypriniformes

**Species:** Bighead - *Hypophthalmichthys nobilis*

Black - *Mylopharyngodon piceus*

Grass - *Ctenopharyngodon idella*

Silver - *Hypophthalmichthys molitrix*

Asian carp include Bighead, Black, Grass, and Silver carp. They were all imported from Asia in the 1960's-1980's to control aquatic weeds and pest species and as a food fish. They have spread via pond escapement or by deliberate release and by release of bait. They grow very quickly and feed voraciously on plankton and native invertebrates. They can eliminate vegetation, eradicate habitat for native fishes, forage for waterfowl, and increase nutrient load. They may also decimate native mussel and snail populations. They compete with larval fish and paddle fish for food resources. They are widespread throughout the Mississippi River drainage and Silver carp are well known for their jumping ability and have injured boaters when doing so. You can help stop this invader when you Inspect, Clean and Dry your aquatic equipment and by reporting any sighting to FWP by calling 406-444-2449 or online at <http://fwp.mt.gov/fishing/guide/AIS/aisSighting>. For more information and to visit the source link to:

Bighead <http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=551>

Black <http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=573>

Grass <http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=514>

Silver <http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=549>



**Bighead  
Carp**

Photo: Courtesy of US  
Fish and Wildlife Service,  
Michigan Sea Grant,  
Bugwood.org



# Invasive Aquatic Plants

13A

Curly Leaf Pondweed

Photo: Leslie J. Mehrhoff,  
University of Connecticut,  
Bugwood.org

13B

Eurasian  
Watermilfoil

Photo: Graves Lovell, Alabama  
Department of Conservation and  
Natural Resources,  
Bugwood.org

13C

Flowering Rush

Photo: Leslie J. Mehrhoff, University of  
Connecticut, Bugwood.org





Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

13A

## Curly Leaf Pondweed

**Genus:** *Potamogeton*  
**Species:** *crispus*

Curly leaf pondweed is native to Africa, Eurasia and Australia, and was introduced into the United States in the early 1900s by hobbyists who used this plant in aquariums. When the aquarium water was dumped into lakes, streams, and rivers, curly leaf pondweed established and crowded out native species. This plant has curly edged leaves that resemble lasagna and a four-angled stem that can grow to lengths of up to 31 inches! Native species of pondweed in Montana have veins that run parallel, whereas veins of curly leaf pondweed branch from a mid-vein in a perpendicular pattern. In MT this plant is a priority 1B noxious weed, report sightings to your local Extension office to stop its spread. For more information and to visit the source link to:

<http://www.mtweed.org/curlyleaf-pondweed/>

[http://agr.mt.gov/agr/Programs/AgClassroom/k-8projects/noxiousweededucation/PDF/30\\_Curlyleaf\\_Pondweed.pdf](http://agr.mt.gov/agr/Programs/AgClassroom/k-8projects/noxiousweededucation/PDF/30_Curlyleaf_Pondweed.pdf)



Graves Lovell, Alabama Department of Conservation and Natural Resources, Bugwood.org

13B

## Eurasian Watermilfoil

**Genus:** *Myriophyllum*  
**Species:** *spicatum*

Eurasian watermilfoil (EWM) is a submerged aquatic plant that is native to Europe, Asia and North Africa. EWM has slender floating stems, submerged leaves that are borne in whorls of four, pinnate, with 12-21 pairs of thread-like leaflets. To determine the difference between native milfoil and EWM, count the number of pairs on a leaf. Native northern milfoil has less than 12 pairs of thread-like leaflets on a whorl. The most common way that EWM is spread is through distribution by watercraft; even the smallest fragment of EWM can establish new plants. In MT this plant is a priority 1B noxious weed, report sightings to your local Extension office to stop its spread. For more information and to visit the source link to:

<http://www.mtweed.org/eurasian-water-milfoil/>

[http://agr.mt.gov/agr/Programs/AgClassroom/k-8projects/noxiousweededucation/PDF/31\\_Eurasian\\_Watermilfoil.pdf](http://agr.mt.gov/agr/Programs/AgClassroom/k-8projects/noxiousweededucation/PDF/31_Eurasian_Watermilfoil.pdf)



Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

13C

## Flowering Rush

**Genus:** *Butomus*  
**Species:** *umbellatus*

Flowering rush is native to Eurasia and was introduced into the United States as an ornamental that escaped cultivation. Flowering rush grows in ditches, marshes, lakes and streams. This aquatic perennial can grow up to 5 feet tall, has a triangular 3-sided stem, and sword-like leaves that can be up to 3 feet long. Flowering rush blooms from June to August. Flowers consist of 3 pink petals and 3 pink sepals that resemble petals. The primary way that this plant reproduces is through creeping rhizomatous roots and 'bulb-lets' that are produced on the rhizomes. In MT this plant is a priority 2B noxious weed, report sightings to your local Extension office to stop its spread. For more information and to visit the source link to:

<http://www.mtweed.org/flowering-rush/>

[http://agr.mt.gov/agr/Programs/AgClassroom/k-8projects/noxiousweededucation/PDF/32\\_Flowering\\_Rush.pdf](http://agr.mt.gov/agr/Programs/AgClassroom/k-8projects/noxiousweededucation/PDF/32_Flowering_Rush.pdf)



# Invasive Terrestrial Plants

14A

Yellow  
Starthistle



Photo: Peggy Greb, USDA  
Agricultural Research Service,  
Bugwood.org

14B

Dyer's Woad



Photo: Steve Dewey, Utah State  
University, Bugwood.org

14C

Rush Skeletonweed



Photo: Steve Dewey, Utah State  
University, Bugwood.org



14A

## Yellow Starthistle

**Genus:** *Centaurea*  
**Species:** *solstitialis*

Yellow starthistle is native to the Mediterranean Basin region. Its stems are grayish-green and leaves are covered with thick cotton-like wool. Lower leaves are deeply lobed while upper leaves are short and narrow having a 'winged' appearance. Bright yellow flowers are surrounded at their base by sharp spines that are up to  $\frac{3}{4}$  inch in length. If ingested by horses, yellow starthistle causes 'chewing disease'; a neurological disorder that creates brain lesions and ulcers in the mouth that can be fatal. In Montana this plant is a priority 1A noxious weed, report sightings to your local Extension office to stop its spread. For more information and to visit the source link to:

<http://www.mtweed.org/yellow-starthistle/>

[http://agr.mt.gov/agr/Programs/AgClassroom/k-8projects/noxiousweededucation/PDF/1\\_Yellow\\_Starthistle.pdf](http://agr.mt.gov/agr/Programs/AgClassroom/k-8projects/noxiousweededucation/PDF/1_Yellow_Starthistle.pdf)



14B

## Dyer's Woad

**Genus:** *Isatis*  
**Species:** *tinctoria*

Dyer's woad is native to central Asia, eastern Siberia, and western Asia. The dyer's woad plant produces a blue substance that was used for centuries as a form of dye for pottery, textiles, and body paint. Dyer's woad was introduced into North America during the colonial period as a dye before indigo dye was available. Dyer's woad has bluish-green alternate lance shaped leaves that are covered with fine hairs. Leaves have a cream colored mid-vein; which is especially noticeable on the rosettes. The flowers of dyer's woad are yellow. Large seeds develop in blackish-blue teardrop-shaped seed pods. In Montana this plant is a priority 1B noxious weed, report sightings to your local Extension office to stop its spread. For more information and to visit the source link to:

<http://www.mtweed.org/dyers-woad/>

[http://agr.mt.gov/agr/Programs/AgClassroom/k-8projects/noxiousweededucation/PDF/2\\_Dyerxs\\_Woad.pdf](http://agr.mt.gov/agr/Programs/AgClassroom/k-8projects/noxiousweededucation/PDF/2_Dyerxs_Woad.pdf)



14C

## Rush Skeletonweed

**Genus:** *Chondrilla*  
**Species:** *junceae*

Rush skeletonweed is native to Europe, Asia, and North Africa and gets its name from the lack of leaves on the plant, which gives it a 'skeletal' appearance. The rosette leaves of this plant look very similar to dandelion leaves. If cut or severed, the leaves and stem excrete a white, milky latex substance that has been researched for making rubber. Coarse brown hairs cover the bottom section of the stem of this plant. Yellow flower heads can produce 500 to 1,500 seeds that have white bristly hairs at one end which aid in dispersal. In Montana this plant is a priority 1B noxious weed, report sightings to your local Extension office to stop its spread. For more information and to visit the source link to:

[http://agr.mt.gov/agr/Programs/AgClassroom/k-8projects/noxiousweededucation/PDF/5\\_Rush\\_Skeletonweed.pdf](http://agr.mt.gov/agr/Programs/AgClassroom/k-8projects/noxiousweededucation/PDF/5_Rush_Skeletonweed.pdf)

<http://www.mtweed.org/rush-skeletonweed/>