2013 INVASIVE SPECIES

Minnesota Invasive Species Advisory Council

EWR-127-13

Threats to Minnesota

Invasive species are non-native plants, animals, and pathogens that cause environmental damage, economic loss, or harm to human health. These pests displace native species, harm habitats, and degrade natural, managed, and agricultural landscapes.

Minnesota is presently battling a number of invasive pests including wild parsnip, zebra mussels, and Japanese hops. There are also many new invasive species that could arrive and cause problems. The list of potential invaders includes bloody red shrimp and Asian longhorned beetle.

In addition to harming the recreational value of our natural resources, invasive pests pose serious economic threats to major Minnesota industries such as agriculture, tourism, and forestry.

Public awareness and action are the keys to preventing the spread of invasive species. Please use the information in this calendar to help inform Minnesotans about the invasive species problem and what they can do to take action in the challenge to reduce invasive species spread and harm.

Information Sources

The Minnesota Invasive Species Advisory Council (MISAC) website provides more information about invasive species in Minnesota. This website is a gateway to invasive species information including many invasive species profiles, contact information for invasive species experts in Minnesota, and links to other related websites.

MISAC website	www.mda.state.mn.us/misac

The following websites of MISAC members also have information about invasive species.

MDA	www.mda.state.mn.us/plants
DNR	www.mndnr.gov/invasives
Minnesota Sea Grant	www.seagrant.umn.edu/ais
National Park Service	www.nps.gov
USDA-APHIS	www.aphis.usda.gov
USDA-Forest Service	www.fs.fed.us/invasivespecies
USDA-National Invasive Species Information Center	www.invasivespeciesinfo.gov
U.S. Fish and Wildlife Service	www.fws.gov/invasives

Included on the back of this calendar is contact information for six agencies with invasive species responsibilities in Minnesota. These agencies, as well as other MISAC members, can provide informational products such as brochures, species identification cards, and videos about invasive species.

Minnesota Invasive Species Advisory Council

This calendar was produced and distributed by the Minnesota Invasive Species Advisory Council (MISAC). MISAC is a statewide entity formed to help:

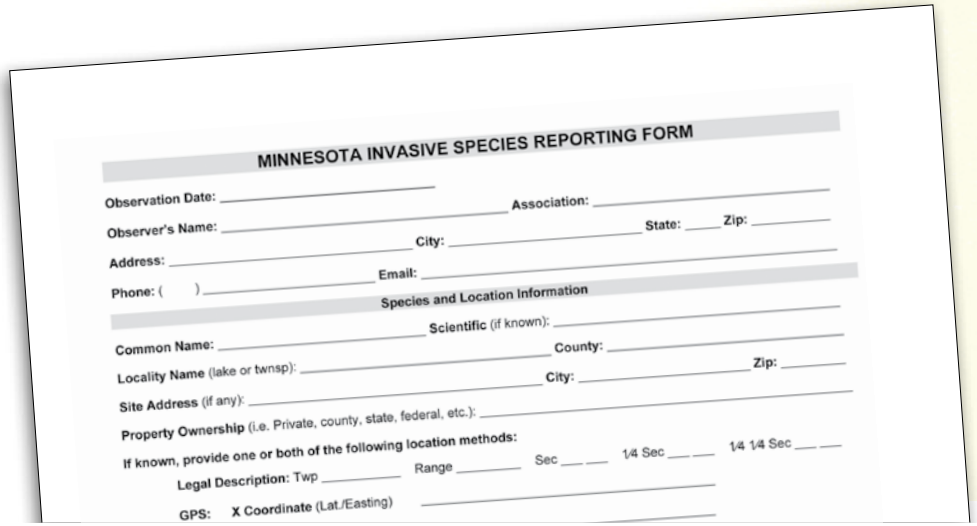
- Promote communication and cooperation among organizations involved in invasive species issues.
- Coordinate outreach on invasive species.
- Support statewide and multi-state conferences related to invasive species issues.
- Support trainings and field visits related to invasive species.
- Recognize outstanding and noteworthy work related to invasive species and encouraging such work through the Carol Mortensen Award.
- Advocate for research and management for the species and pathways deemed greatest risk.

MISAC's co-chairs from the Minnesota departments of Agriculture and Natural Resources represent the state agencies that are responsible for coordinating the management of invasive species in the state. The Council also includes these members: Bailey Nurseries, Leech Lake Band of Ojibwe, Minnesota Association of County Agricultural Inspectors, Minnesota Board of Water and Soil Resources, Minnesota Crop Improvement Association, Minnesota Department of Transportation, Minnesota Forestry Association, Minnesota Nursery and Landscape Association, Minnesota Shade Tree Advisory Committee, National Park Service, The Nature Conservancy, USDA-Animal and Plant Health Inspection Service, USDA-Natural Resources Conservation Service, U.S. Fish and Wildlife Service, U.S. Forest Service, University of Minnesota, and University of Minnesota Sea Grant Program.

Help Report Locations of Invasive Species

One of the keys for a rapid response to invasive species is the early identification of new occurrences. Please help report occurrences of invasive species in Minnesota at the following:

- MISAC website at: www.mda.state.mn.us/misac and click on "Reporting Invasive Species".
- MDA "Arrest the Pest" at (651) 201-MOTH (metro) or 1-888-545-MOTH (toll free) or arrest.the.pest@state.mn.us to report suspicious pest species arriving on plants or articles from foreign countries or other states. Report terrestrial invasive plants, insects, or diseases such as gypsy moth, emerald ash borer, soybean rust, sudden oak death, Japanese hops, and Oriental bittersweet.
- DNR Invasive Species Program at: (651) 259-5100 (metro) or 1-888-MINNDNR (toll free) to report invasive aquatic plants or wild animals such as Eurasian watermilfoil, zebra mussels, Asian carp, round goby, non-native deer, and mute swans.
- Or, as specified for individual species in the invasive species calendar.


MINNESOTA INVASIVE SPECIES REPORTING FORM

Observation Date: _____ Association: _____

Observer's Name: _____ City: _____ State: ____ Zip: _____

Address: _____ Email: _____

Phone: ( ) _____

Species and Location Information

Common Name: _____ Scientific (if known): _____

Locality Name (lake or twnsp): _____ County: _____

Site Address (if any): _____ City: _____ Zip: _____

Property Ownership (i.e. Private, county, state, federal, etc.): _____

If known, provide one or both of the following location methods:

Legal Description: Twp _____ Range _____ Sec ___ ___ 1/4 Sec ___ ___ 1/4 1/4 Sec ___ ___

GPS: X Coordinate (Lat./Easting) _____

Photo: Marvin Moriarty/USFWS

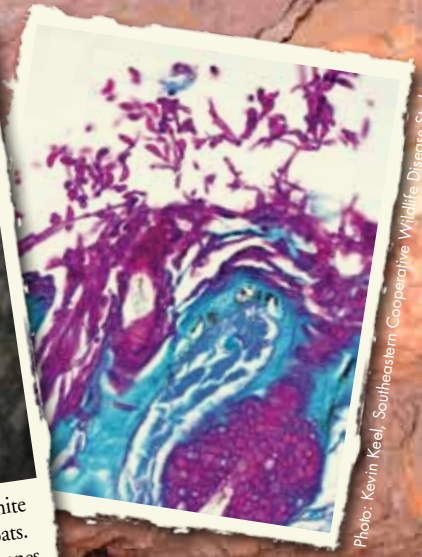


Photo: Kevin Keel, Southeastern Cooperative Wildlife Disease Study

Keys to ID: *Geomyces destructans* can form white fungal growth on the noses, wings, and ears of bats. It also causes lesions in the wing and tail membranes.

WHITE-NOSE SYNDROME IN BATS

Photo: Deb Rose, DNR

White-nose Syndrome in Bats

Geomyces destructans

Species: *Geomyces destructans* (Gd) is a cold-loving fungus that causes white-nose syndrome in hibernating bats.

Origin: Evidence suggests that the fungus originated in Europe and was recently transported to North America; samples from both continents are genetically identical.

Impacts: Catastrophic declines in bat populations have occurred across the eastern U. S. and Canada. The loss of these insect predators could lead to agricultural and forestry losses estimated at more than $3.7 billion per year.

Status: White-nose syndrome was first documented in New York in 2006-2007. Since then, the fungus has spread rapidly across eastern North America to 22 states and four Canadian provinces.

Where to look: The fungus is visible on bats in the winter, but not in the summer.

Regulatory classification (agency): Gd is identified as a high-risk pathogen of concern requiring action to prevent its spread in Minnesota (DNR).

Means of spread: The most likely mode of spread is bat-to-bat contact. Because Gd spores can remain in infected caves for years, other animals and humans can transport the fungus to other caves.

How can people help?

• Report any strange bat behavior, such as winter day-flying or dying bats to the DNR Bat Observation Report website at www.dnr.state.mn.us/reportbats or DNR Information Center at 1-888-646-6367.

• Do not enter caves during winter where bats are hibernating.

• Do not bring any clothing or equipment that has been in infected caves into clean caves.

Further information: Visit www.mndnr.gov/wns or the white-nose syndrome website at www.whitenosesyndrome.org/.

JANUARY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 *New Year's Day*	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21 *Martin Luther King, Jr. Birthday*	22	23	24	25	26
27	28	29	30	31		

BLOODY RED SHRIMP

Photo: Steve Pothoven, NOAA-GLERL

Keys to ID: Bloody red shrimp form reddish swarms in the shadows of piers, docks, and boats. They are reddish, less than ½-inch long, and have stalked eyes.

Photo: NOAA-GLERL

Bloody Red Shrimp

Hemimysis anomala

Species: Bloody red shrimp are small freshwater crustaceans.

Origin: Native to Eastern Europe/Western Russia, they were introduced by ballast water discharged from foreign ships.

Impacts: There are no recorded impacts yet associated with the recent introduction of this species to the Great Lakes. Swarms of bloody red shrimp can reach populations of over 300 individuals per cubic meter. They eat small zooplankton and algae and may compete with young fish.

Status: It has been reported from all the Great Lakes except for Lake Superior. It has not been found or reported from any Minnesota waters.

Where to look: Bloody red shrimp prefer rocky bottoms of canals, streams, lakes, and reservoirs. These crustaceans are nocturnal, staying near the bottoms of lakes during the day and migrating up in the water at night. They often are more common in deeper waters (20-60+ feet) and have low survival in water temperatures around 32° F over winter.

Regulatory classification (agency): Bloody red shrimp are *unlisted non-native species* (DNR). They may not be legally introduced into Minnesota waters.

Means of spread: Originally spread by ballast water discharge, there is concern they could be unintentionally transported inland in livewells and bait buckets.

How can people help?

- Inspect and remove aquatic plants and animals from boats, trailers, and equipment.
- Drain water from bilges, livewells, and bait buckets before leaving the access.
- Report infestations.

Further information: Contact Minnesota Sea Grant or DNR Invasive Species Specialists at www.mndnr.gov/invasives/contacts.html.

FEBRUARY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2 *Groundhog Day*
3	4	5	6	7	8	9
10	11	12 *Lincoln's Birthday*	13	14 *Valentine's Day*	15	16
17	18 *Presidents' Day*	19	20	21	22 *Washington's Birthday*	23
24	25	26	27	28		

EMERALD ASH BORER BIOCONTROL

Photo: Monika Chandler, MDA

Keys to ID: The parasitoids are extremely small and may look similar to other native parasitoid species. A specialist is required for correct identification. More information on biocontrol can be found at www.mda.state.mn.us/plants/pestmanagement/eab/eabbiocontrol/eabbiocontrolagents.aspx

Photo: Josh Plunkett, MDA

Emerald Ash Borer Biocontrol: Parasitoid Wasps

Oobius agrili, Spathius agrili and *Tetrastichus planipennisi*

Species: These are non-stinging wasps introduced for emerald ash borer biocontrol.

Origin: They are native to China.

Impacts: Parasitoid wasps reduce emerald ash borer (EAB) populations in their native range. Release of these wasps in low level EAB infested areas provides an opportunity for wasp populations to establish and spread with EAB as it moves through an area.

Status: Establishment in Minnesota is unknown. It has typically taken two years of wasp releases at sites before a large enough population exists to detect the parastoids in the field. A current map of release sites in Minnesota can be found at gis.mda.state.mn.us/maps/eab.

Where to look: They are found at sites where EAB infestations occur and introductions of parasitoids have been made. To recover them, one must either search the bark for parasitized EAB eggs or fell and peel trees to look for parasitoid larvae inside of EAB galleries underneath the bark.

Regulatory classification (agency): A federal permit is required for research and release (USDA APHIS).

Means of spread: Parasitoid wasps are introduced by releasing them on ash trees at locations with known EAB infestations.

How can people help?

- Watch for symptoms of EAB in ash trees and report suspect finds to MDA at arrest.the.pest@state.mn.us or 1-888-545-6684.
- Follow state firewood and quarantine regulations.

Management information: Biological control is currently the only option for EAB management at the forest level. Urban and residential EAB management recommendations can be found at www.mda.state.mn.us/en/plants/pestmanagement/eab.aspx

MARCH

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3 *March 3-8 National Invasive Species Awareness Week*	4	5	6	7	8	9
10 *Daylight Saving Time Begins*	11	12	13	14	15	16
17	18	19	20 *Spring Begins*	21	22	23
24	25	26 *Passover*	27	28	29	30
31 *Easter*						

RECREATION PATHWAY

Photo: Kimberly Thielen-Cremers

Keys to ID: Gypsy moth: Caterpillars are hairy and have 5 pairs of blue dots and 6 pairs of red dots down their backs. The adult male has feathery antennae and is light beige to dark brown with black jagged bands on its forewings. The adult female is white with brown zig-zag markings on its wings.

Photo: DNR

Keys to ID: Wild parsnip: The leaves alternate and are made up of 5-15 egg-shaped leaflets along both sides of a common stock; leaflets are sharply toothed or lobed at the margins; upper leaves are smaller; flat-topped broad flower clusters are 2-6" wide with numerous five-petaled yellow flowers; blooms from June to late summer.

Photo: Paul Stafford, Explore Minnesota Tourism

Recreation Pathway

Gypsy Moth *Lymantria dispar*

Wild Parsnip *Pastinaca sativa*

Species: These are examples of invasive species that can be easily spread during recreational activities on land such as camping, hiking, biking, all-terrain vehicle riding, and horseback riding.

Origin: Gypsy moth in the U.S. are usually of European origin, although introductions of Asian strains have occurred. Wild parsnip is native to Eurasia.

Impacts: Gypsy moth can defoliate over 300 different species of trees and shrubs. Skin contact with wild parsnip sap, when combined with exposure to sun, can cause a severe burn. Invasive plants, insects, pathogens, and animals can degrade recreational experiences and damage native woodlands, prairies, and wetlands.

Status: No permanent populations of gypsy moth are known to occur in Minnesota. Wild parsnip is most common in southeast Minnesota, but can be found in most counties in the state.

Where to look: Look for these and other invasive species anywhere you recreate.

Regulatory classification (agency): Gypsy moth is not quarantined in Minnesota at this time. Wild parsnip is *a prohibited noxious weed* (MDA).

Means of spread: Invasive plant seeds can be transported in mud on boots, equipment, and vehicles as well as in hay or stuck to clothes or pets. The eggs and larvae of invasive insects can be spread by moving firewood. Additionally, gypsy moth egg masses can be attached to vehicles and tents.

How can people help?

- Clean your gear before entering and leaving the recreation site.
- Burn only local or certified firewood.
- Stay on established trails.
- Use weed-free hay.

Further information: Visit www.playcleango.org for further information.

APRIL

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22 *Earth Day*	23	24	25	26 *Arbor Day*	27
28	29	30				

Play Clean Go

STOP INVASIVE SPECIES IN YOUR TRACKS.

PlayCleanGo.org

WATER LETTUCE

Photo: Richard Old, XID Services, Inc., Bugwood.org

Keys to ID: Water lettuce, also called water cabbage, is a floating plant that resembles a head of lettuce with light-colored feathery roots. Leaves are hairy, ridged, very thick, and dull green.

Photo: Richard Carter,
Valdosta State University, Bugwood.org

Water Lettuce

Pistia stratiotes

Origin and spread: Likely native to Africa or South America, water lettuce was first found in Florida in 1765. It has since spread as far north as New York and west to Ohio in the Great Lakes region.

Impacts: Floating mats on lakes and rivers can interfere with boating, swimming, and other water activities. It also negatively affects native underwater plants and other aquatic life by blocking sunlight and causing decreases in oxygen levels and biological diversity.

Status: It was found in Pool 5 of the Mississippi River near Winona in 2012. Small infestations were removed from Lake Winona in 2000 and the Vermillion River west of Farmington, MN, near a plant nursery.

Where to look: It occurs on lakes, rivers, and ponds.

Regulatory classification (agency): Water lettuce is classified as an *unlisted invasive species* in Minnesota (DNR). It is illegal to introduce water lettuce into public waters of Minnesota.

Means of spread: Water lettuce used in water gardens may establish in natural waters when planted or discarded there.

How can people help?

- Inspect plant orders and remove unwanted seed, plant fragments, snails, and fish.
- Do not release or plant non-native plants in natural waters.
- Contact the DNR before transplanting aquatic plants.

Further information: Contact Minnesota Sea Grant or DNR Invasive Species Specialists at www.mndnr.gov/invasives/contacts.html.

MAY

Habitattitude™
PROTECT OUR ENVIRONMENT
DO NOT RELEASE FISH AND AQUATIC PLANTS
www.Habitattitude.net

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5	6	7	8	9	10	11
12 *Mother's Day*	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27 *Memorial Day Observed*	28	29	30	31	

Photo: Dr. Mohamed Faisal, Michigan State University

Keys to ID: VHS: At a low level of infection, fish might not display any symptoms. Fish severely infected will die, and will display hemorrhages (bleeding) throughout body surface (eye, skin and fins) and within the internal organs (swim bladder, intestine, kidney etc.).

Keys to ID: Rusty crayfish: The carapace (outer covering) usually has a pair of rusty-colored spots. Claws often have black bands at the tips.

BAIT PATHWAY

Photo: Bernard Seitman, DNR

Bait Pathway

Rusty Crayfish

Oronectes rusticus

Viral Hemorrhagic Septicemia (VHS)

Species: These are examples of aquatic invasive species that can be spread by the use of bait and in water used to transport bait.

Origin: The rusty crayfish is native to Illinois, Indiana, Ohio, Kentucky, and Tennessee. The VHS virus has been known in Europe, Japan, and the coasts of the U.S. for many years. How VHS was introduced into Lake Superior and the other Great Lakes is unknown.

Impacts: Rusty crayfish can harm native fish by feeding on their eggs and young, drive out or hybridize with native crayfish, and eliminate aquatic vegetation. VHS causes deaths of many important sport fish.

Status: The rusty crayfish is confirmed in about 50 Minnesota waters, mostly in central and northern counties. VHS has not been documented in inland Minnesota waters, but has been found in Lake Superior.

Regulatory classification (agency): Rusty crayfish is a *regulated invasive species* (DNR). A federal order under the Animal Health Protection Act restricts the transport of VHS-infected fish (USDA-APHIS). Minnesota DNR regulates the use of baits.

Means of spread: Aquatic invasive species and fish diseases potentially can be spread by using bait.

How can people help?

- Know the laws in Minnesota which prohibit the use of crayfish for bait except in waters where they were captured. Anglers cannot catch crayfish and transport for use in other waters.
- When keeping bait, exchange water in bait containers with tap or bottled water prior to leaving the waterbody.
- When not keeping live bait, drain water and dispose of unwanted bait in the trash.

Further information: Visit www.mndnr.gov/invasives

JUNE

STOP AQUATIC HITCHHIKERS!™

Prevent the transport of nuisance species.
Clean all recreational equipment.
www.ProtectYourWaters.net

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
9	10	11	12	13	14 *Flag Day*	15
16 *Father's Day*	17	18	19	20	21 *Summer Begins*	22
23 30	24	25	26	27	28	29

JAPANESE HOPS

Photo: Chris Evans, River to River CWMA, Bugwood.org

Keys to ID: Lush, green vines can grow 35 inches in a season and can form dense mats. Leaves are opposite, 2-6 inches long, have toothed edges, and 5-7 lobes arranged palmately. Stems and leaves have hooked hairs. There are separate male and female plants. Flowers are greenish with 5 petals. Male flowers are arranged in airy cone-shaped clusters. Female flowers are arranged in short spikes.

Photo: MDA

Japanese Hops
Humulus japonicus

Species: Japanese hops is an herbaceous annual vine.

Origin: Japanese hops is native to eastern Asia and was introduced to North America as an ornamental in the mid-to-late 1880s. It is not used to make beer.

Impacts: Its vines rapidly grow to smother desirable species and impede forest regeneration.

Many people have an allergic reaction to its pollen. In addition, the hooked hairs on the stems and leaves can cause contact dermatitis and skin blistering.

Status: In Minnesota, there are two confirmed occurrences in the southeast: one along the Root River and the other along the Mississippi River, just north of several infestations in Iowa and Wisconsin.

Where to look: It prefers full or partially sunny areas in riparian areas, grasslands, hayfields, and roadsides.

Regulatory classification (agency): Japanese hops is a *prohibited noxious weed* on the eradicate list (MDA). All above and below ground parts of the plant must be destroyed. Additionally, no transportation, propagation, or sale of these plants is allowed.

Means of spread: It reproduces by seed that can be dispersed by wind, water, wildlife, vehicles, and equipment.

How can people help?
- Do not plant Japanese hops.
- Avoid moving seed on clothing, vehicles, and equipment from infested areas.
- Report infestations to MDA at arrest.the.pest@state.mn.us or 1-888-545-6684.

Further information: Visit www.mda.state.mn.us/plants/badplants/japshops.aspx

JULY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4 *Independence Day*	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

ASIAN LONGHORNED BEETLE

Photo: Melody Keena, USDA Forest Service, Bugwood.org

Keys to ID: Shiny black beetles with bright white spots and bodies ranging from 1-1-1/2 inches in length. Antennae can be up to 1-1/2 times the body length. The upper sections of adult legs are whitish-blue. Larvae are very large and are found in tunnels deep in the wood. ALB may be mistaken for two species native to the U.S., the cottonwood borer and the white spotted sawyer.

Photo: Pennsylvania Department of Conservation and Natural Resources - Forestry Archive, Bugwood.org

Asian Longhorned Beetle

Anoplophora glabripennis

Species: Also known as sky beetle, Asian longhorned beetle (ALB) is a large beetle in the family Cerambycidae.

Origin: It is native to Eastern China, Korea, and Japan.

Impacts: The larvae (immature stage) tunnel into the wood of many tree species including maple (Norway, sugar, silver, and red), birch, horse chestnut, poplar, willow, elm, ash, and black locust. Heavily infested trees can be killed.

Status: The first report of ALB was in Brooklyn, New York, in 1996. Since then, it also has been found in Chicago, New Jersey, Toronto, Massachusetts, and most recently in southeast Ohio (June, 2011).

Where to look: Adults can be seen from late spring to fall. Look for large, dime-sized round exit holes and saw dust in the crotch of branches.

Regulatory classification (agency): It is a *federally quarantined pest* (USDA-APHIS).

Means of spread: Beetles can fly distances greater than 400 yards and can easily and unknowingly be moved in firewood, live trees, or fallen timber, wooden pallets, and crating.

How can people help?

• Report any suspicious beetles and unusual tree decline or mortality to MDA at arrest.the.pest@state.mn.us or 1-888-545-6684.

Further information: Visit www.aphis.usda.gov/plant_health/plant_pest_info/asian_lhb/alb_maps.shtml

AUGUST

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

MEADOW KNAPWEED

Photo: MDA

Keys to ID: Meadow knapweed has multiple upright, reddish stems that are 20-40 inches tall. Single flowers, mostly pink/purple, but occasionally white, are approximately ¾-inch in diameter. Flowering occurs mid-summer until fall. Leaves are lance shaped and pubescent, occasionally with wavy margins or lobed. Basal leaves grow up to 4 inches long.

Photo: MnDOT

Meadow Knapweed

Centaurea x moncktonii, C. jacea x nigra, C. pratensis, and C. debauxii

Species: Meadow knapweed is a perennial plant. It is likely a fertile hybrid between black (*C. nigra L.*) and brown (*C. jacea L.*) knapweed.

Origin: Meadow knapweed is native to Europe

Impacts: Although meadow knapweed was introduced in the Pacific Northwest as forage, it is not palatable and has low nutritional value. It escaped cultivation and is rapidly overtaking desirable vegetation.

Status: In Minnesota, there are meadow knapweed infestations in St. Louis and Koochiching counties.

Where to look: It thrives in sunny and wet conditions such as wet meadows, hayfields, pastures, riparian areas, roadsides, and forest openings.

Regulatory classification (agency): Meadow knapweed is not regulated in Minnesota, but will be evaluated by the Minnesota Noxious Weed Advisory Committee.

Means of spread: Meadow knapweed is spread primarily by seed, but also by root crown fragments. Seed can be dispersed by wind, water, vehicles, and with hay.

How can people help?

• Avoid transporting meadow knapweed from infested areas by cleaning equipment, vehicles, and footwear after contact with it.
•Identify and report infestations to MDA at arrest.the.pest@state.mn.us or 1-888-545-6684.

Further information: Visit www.mda.state.mn.us/plants/badplants/meadowkw.aspx

SEPTEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 *Labor Day*	3	4	5 *Rosh Hashanah*	6	7
8 *Grandparents' Day*	9	10	11	12	13	14
15	16	17	18	19	20	21
22 *Fall Begins*	23	24	25	26	27	28
29	30					

Photo: Yuri Baranchikov, Institute of Forest SB RASC, Bugwood.org

Keys to ID: Siberian Moth: Color varies from light yellow-brown or light gray to dark brown, almost black; front wings are marked by darks strips and a white spot in the center.

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

Keys to ID: Rosy Moth: Stout bodied, gray-brown with transverse yellow bands on thorax.

Photo: Stanislaw Kinelski, Bugwood.org

Keys to ID: Pine-tree Lappet: Female generally larger than male; adult male has feathered antennae; dark, straight crossline halfway across forewing followed by a wavy crossline; white dot on forewing.

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

Keys to ID: Gypsy Moth: Adult male has feathery antennae and is light beige to dark brown with black jagged bands on its forewings. The adult female is white with brown zig-zag markings on its wings and cannot fly.

Photo: Stanislaw Kinelski, Bugwood.org

Keys to ID: Nun Moth: White forewings with numerous dark, transverse, wavy lines and patches. Adult male has grey-black abdomen. Adult female has reddish-brown abdomen with black spots.

ASIAN DEFOLIATORS

Photos: William M. Ciesla, Forest Health Management International, Bugwood.org

Asian Defoliators

Asian Gypsy Moth
Lymantria dispar asiatica

Nun Moth
Lymantria monacha

Rosy Moth
Lymantria mathura

Pine-tree Lappet
Dendrolimus pini

Siberian Moth
Dendrolimus sibiricus

Species: These Lepidopteran are targets in the Minnesota Department of Agriculture's early detection trapping survey.

Origin: They are native to Eurasia and the Far East.

Impacts: These species have potentially devastating tree defoliating habits and capacities. They are all serious forest pests in their native ranges, attacking a broad range of coniferous and deciduous host plants that can lead to substantial economic, environmental, and social impacts.

Status: None of the Asian defoliator target species are known to be established in the U.S., although several introductions and follow-up eradications of Asian gypsy moth have occurred over the years.

Where to look: As a general rule, inspect and remove all egg masses from outdoor items and vehicles when you travel.

Regulatory classification (agency): USDA APHIS has identified these five pests for targeted surveys because of their very high invasion risk and widespread damage potential. Regulatory measures will be taken if populations are found.

Means of spread: Asian defoliator moths can move on wind currents or hitchhike, making them highly mobile. They lay egg masses on any available surface including nursery stock, firewood, campers, lawn chairs, etc. From there, they will hitch a ride to new non-infested areas.

How can people help?
If you have a "suspect" moth, contact MDA at gypsy.moth@state.mn.us or 1-888-545-6684.

Further information: Contact MDA.

OCTOBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7	8	9	10	11	12
13	14 *Columbus Day*	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31 *Halloween*		

GIANT SALVINIA

Keys to ID: Leaves are oblong, velvety, green to gold, and ½-2 inches long. Leaf surface, with rows of hairs that join at the tips, resembles miniature egg beaters. Young plants lie flat on water's surface. Mature plants fold into upright chains and have root-like structures which hide stalks with egg-shaped spore cases.

Photo: Larry D. Hodge, Texas Parks and Wildlife Department

Photo: Larry D. Hodge, Texas Parks and Wildlife Department

Giant Salvinia
Salvinia molesta

Species: Giant salvinia is an aquatic plant in the water fern family.

Origin: Native to Brazil, it was discovered in Texas in 1997. It is now found in every southern state from California across the Gulf of Mexico to North Carolina and Hawaii.

Impacts: This free-floating fern can double its biomass every 3-4 days. Dense mats up to 2 feet thick choke waterways, clog water intakes, and interfere with swimming, boating, and fishing. It displaces native aquatic plants, depletes dissolved oxygen, and impacts fish and other aquatic life.

Status: It is present in the U.S., but has not been found in Minnesota.

Where to look: Look for giant salvinia in shallow ponds, ditches, and shorelines of lakes and rivers.

Regulatory classification (agency): It is on the Federal List of Noxious Weeds (USDA) and is a *prohibited invasive species* in Minnesota (DNR).

Means of spread: Giant salvinia used in water gardens may establish in natural waters when planted or discarded there. Small plants may "hitchhike" on aquatic plant shipments. It can also spread accidentally when transported on boats, trailers, and equipment.

How can people help?
- Dispose of unwanted aquatic plants in sealed plastic bags in the trash.
- Remove aquatic plants from recreational watercraft, trailers, and equipment before leaving the access.

Further information: Contact Minnesota Sea Grant Program or DNR Invasive Species Specialists at www.mndnr.gov/invasives/contacts.html.

NOVEMBER

STOP AQUATIC HITCHHIKERS!™
Prevent the transport of nuisance species.
Clean all recreational equipment.
www.ProtectYourWaters.net

Habitattitude™
PROTECT OUR ENVIRONMENT
DO NOT RELEASE FISH AND AQUATIC PLANTS
www.Habitattitude.net

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3 *Daylight Saving Time Ends*	4	5	6	7	8	9
10	11 *Veterans' Day*	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27 *Hanukkah Begins*	28 *Thanksgiving Day*	29	30

Ug99

Photo: Brian Steffenson, University of Minnesota

Keys to ID: Ug99 produces brick-red or black fungal spore masses on stems and leaves of wheat and barley plants.

Photo: Brian Steffenson,
University of Minnesota

Ug99 Strain of Wheat Stem Rust

Puccinia graminis f. sp. *tritici*

Species: Ug99 is a fungal pathogen of wheat and barley.

Origin: This strain of wheat stem rust was first detected in Uganda in 1999. It has since been detected in Kenya, Sudan, Ethiopia, Yemen, and Iran.

Impacts: Ug99 is able to infect many wheat and barley varieties with resistance to wheat stem rust. Potential yield losses of 50-70% have been estimated for the United States if this pathogen were to become established. Ug99 is considered a major threat to wheat and barley production globally.

Status: Ug99 has not been detected in North America. USDA-APHIS is working to keep it out of the United States though quarantine restrictions on materials coming from countries with the pathogen. APHIS, USDA's Agricultural Research Service, MDA, and the University of Minnesota, among others, are working to better understand the biology of the pathogen, to identify new sources of resistance, and to develop response plans should the pathogen be detected in the U.S.

Where to look: Look for brick-red (uredinial stage) or black (telial stage) fungal spore masses on stems and leaves of wheat and barley plants. The pathogen also infects common barberry (*Berberis vulgaris*), a non-native plant that was largely eradicated from major wheat-producing states.

Regulatory classification (agency): Ug99 is federal quarantine significant (USDA APHIS).

Means of spread: The pathogen can be spread by wind, on clothing, or in infected plant material.

How can people help?

- Wheat and barley producers can inspect fields for the disease.
- Report potential finds to MDA or USDA-APHIS.

Further information: Visit www.ars.usda.gov/Ug99/

DECEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21 *Winter Begins*
22	23	24	25 *Christmas Day*	26	27	28
29	30	31 *New Year's Eve*				

For information about invasive species in Minnesota, contact:

Aquatic Plants and Animals

Minnesota Department of Natural Resources-Invasive Species Program
(651) 259-5100

University of Minnesota-Sea Grant Aquatic Invasive Species Information Center
(218) 726-8712

U.S. Fish and Wildlife Service
(612) 713-5114

Terrestrial Plants and Insects

Minnesota Department of Agriculture-Invasive Species Programs
(651) 201-6328

Minnesota Department of Natural Resources-Division of Forestry
(651) 259-5300

USDA-Animal and Plant Health Inspection Service
(612) 725-1722

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FSC LOGO

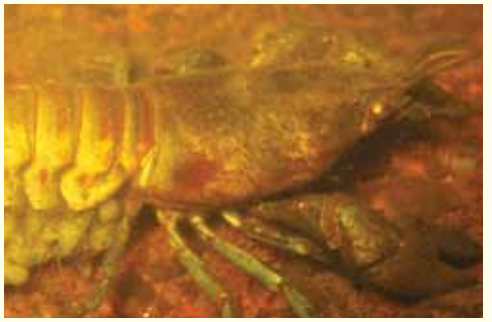
White-nose Syndrome in Bats

Bloody Red Shrimp

Emerald Ash Borer Biocontrol

Recreation Pathway

Water Lettuce



Bait Pathway

Japanese Hops

Asian Longhorned Beetle

Meadow Knapweed

Asian Defoliators

Giant Salvania

Ug99 Rust of Wheat