



Invasive Species

Threats to Minnesota



2005 Calendar

Minnesota Invasive Species Advisory Council

Invasive Species

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 gypsy moth, zebra mussels, Eurasian milfoil, purple loosestrife, and garlic mustard. There are also many new invasive species that could arrive and cause problems. The list of potential invaders includes Asian longhorned beetle, emerald ash borer, bighead carp, silver carp, hydrilla, and kudzu.

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. Nationwide, some estimates peg the economic damage of invasive pests at more than \$100 billion a year.

Public awareness and action is key to preventing the spread of invasive species.

About the cover

Garlic mustard and purple loosestrife photos by Jay Rendall. Asian lady beetle photo by Rob Venette. Gypsy Moth photo by Peter Dziuk. Silver carp photo by David Riecks. Earthworm photo by Steve Mortensen.



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 in response to Presidential Executive Order 13112 on invasive species and the national Invasive Species Management Plan that encouraged states to plan and take action on invasive species.

The purposes of MISAC are:

- to facilitate statewide coordination and cooperation on invasive species—including the review of information concerning the current status, management, and spread of terrestrial and aquatic invasive insect, plant, animal, and pathogen species into and within Minnesota;
- to work cooperatively to prevent new introductions, identify, and locate invasive species;
- to contain established introductions; to manage invasions and take other actions in order to minimize invasive species impacts within Minnesota; and
- to address these and other existing needs by maximizing available resources.

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. In addition, the Council includes these members: U.S. Fish and Wildlife Service, U.S. Forest Service, Superior National Forest, USDA-APHIS, Minnesota Department of Transportation, Minnesota Board of Water and Soil Resources, University of Minnesota—College of Agriculture, Food and Environmental Sciences and the College of Natural Resources, Minnesota Sea Grant, Minnesota Nursery and Landscape Association, Bailey’s Nursery, Leech Lake Band of Ojibwe, The Nature Conservancy, The Minnesota Native Plant Society, Minneapolis Parks and Recreation Board, Minnesota Crop Improvement Association, Sugarloaf Interpretive Center Association, Minnesota Association of County Agricultural Inspectors, Farm Bureau, and Minnesota Golf Course Association.

Reporting Locations of Invasive Species

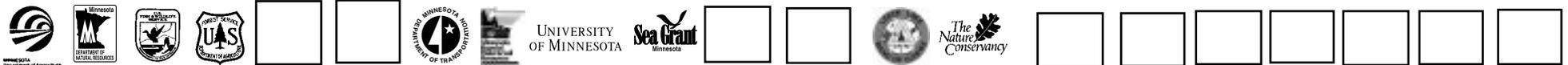
One of the keys for a rapid response to invasive species is the early identification of new occurrences. Please help report occurrences of invasive species in Minnesota at the following:

- MISAC Web site at: www.mda.state.mn.us/misac/
- “Arrest the Pest” Hotline at: 651-296-MOTH (metro) or 1-888-545-MOTH (toll free). Please call the hotline to report suspicious pest species arriving on plants or articles from foreign countries or other states, and for the latest updates on invasive species such as the gypsy moth, soybean rust, sudden oak death, Asian long-horned beetle, emerald ash borer, bark beetles, and other destructive insect, plant, and disease pest species.
- DNR Invasive Species Program at: 651-296-2835 (metro) or 1-888-MINN-DNR (elsewhere) to report invasive aquatic plants or wild animals such as Eurasian water milfoil, zebra mussels, Asian carp, round goby, non-native deer, and spiny waterflea.

Carol Ann Estes Mortensen

May 24, 1951 - Sept. 11, 2004

The Council would like to recognize the contributions of one of its members, Carol Mortensen. Carol participated on the Council on behalf of the Leech Lake Band of Ojibwe. She was also active on other invasive species efforts in the state, such as authoring books on noxious weeds and invasive species, co-authoring a magazine article about invasive earthworms, and participating on an interagency earthworm response team. Council members appreciate her valuable contributions and were saddened by her passing on September 11, 2004, after a long and courageous battle with cancer. The Council will continue to recognize her by establishing an annual award in her name.



Curly-leaf Pondweed *Potamogeton crispus*



Photo: Jay Rendall

Keys to ID: Leaves have undulating and finely serrated edges.

Curly-leaf pondweed

Potamogeton crispus L.

Species: Curly-leaf pondweed is a rooted submersed aquatic plant.

Origin: It is native to Eurasia, Africa, and Australia and was first noticed in Minnesota about 1910.

Impacts: It forms dense mats on the water surface in late spring and early summer causing problems for water recreation. Mid-summer die off causes rafts of dying plants on shore and can lead to an increase in algae.

Status: Curly-leaf pondweed is established in Minnesota.

Where to look: It is found in the littoral zone of lakes and ponds.

Regulatory classification (agency):

It is a *prohibited invasive species* (DNR).

Means of spread: Curly-leaf pondweed often is incidentally transported on water recreation equipment.

How can people help? Remove all aquatic plants before transporting boats and equipment from one waterbody to another.

Further information: Contact DNR Fisheries or DNR Invasive Species Program.

January

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1 <small>New Year's Day</small>
2	3	4	5	6	7	8
9	10	11 <small>Minnesota Invasive Species Advisory Council Meets</small>	12	13	14	15
16	17 <small>Martin Luther King, Jr. Birthday</small>	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Eurasian Earthworms

Lumbricus spp., *Amyntas spp.*,
Eisenia spp., *Aporrectodea spp.*



Photo: Steve Mortensen

Keys to ID: Visit www.nrri.umn.edu/worms for identification information.

Eurasian Earthworms

Lumbricus spp., *Amyntas spp.*,
Eisenia spp., *Aporrectodea spp.*

Species: All terrestrial earthworms, such as angleworms and night crawlers, are non-native in Minnesota.

Origin: Native to Europe and Asia, they probably first arrived in soils, either used for ship's ballast or with potted plants brought from Europe.

Impacts: Earthworms consume the leaf litter of forests, causing tree seedlings, ferns, wildflowers, and potentially water quality to decline.

Status: Fifteen non-native earthworm species are established in many areas of the state.

Where to look: They are found in the soil of natural and managed landscapes.

Regulatory classification (agency):
They are an *unlisted non-native species* (DNR).

Means of spread: Earthworms or their egg cases are moved primarily through human activities such as dumping bait, community composting, recreation, road construction, and in plant material.

How can people help? Place unwanted bait in the trash—it's illegal to release most non-native species into the wild (Minn. Stat. 84D.06). Be cautious moving plant material to forest areas.

Management information: There are no methods to control earthworm populations in natural habitats; preventing new infestations is the best protection.

February

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1	2 <small>Groundhog Day</small>	3	4	5
6	7	8	9	10	11	12 <small>Lincoln's Birthday</small>
13	14 <small>Valentine's Day</small>	15	16	17	18	19
20	21 <small>Presidents' Day</small>	22 <small>Washington's Birthday</small>	23	24	25	26
27	28					

National Weed
Awareness Week Begins

Spotted Knapweed *Centaurea biebersteinii* L.



Photo: Angela Anderson

Keys to ID: Flowers have distinctive darkened upside-down V patterns on the bracts.

Spotted Knapweed

Centaurea biebersteinii L., formerly *Centaurea maculosa* Lam.

Species: Spotted knapweed is a short-term perennial forb.

Origin: Native to Europe and Asia, it was introduced to the U.S. in the early 1900s, most likely from contaminated forage seed.

Impacts: It reduces the biological diversity of natural habitats and decreases the quality of livestock forage production.

Status: It was first recorded in Minnesota in the early 1930s. To date, it has been found in more than 40 Minnesota counties.

Where to look: It is commonly found in highly disturbed habitats with plenty of sun exposure and well-drained sandy soils.

Regulatory classification (agency): It is listed as a *secondary noxious weed* in Minnesota (MDA and counties).

Means of spread: Seeds are small and lightweight and easily transported by wind, water, wildlife, mowing equipment, foot and vehicle traffic, gravel and soil redistribution, and livestock.

How can people help? Report infestations to your local weed inspector.

Further information: Contact the Minnesota Department of Agriculture's Weed Integrated Pest Management Project.

March

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17 ^{St. Patrick's Day}	18	19
20 ^{Spring Begins}	21	22	23	24	25	26
27 ^{Easter}	28	29	30	31		

Garlic Mustard *Alliaria petiolata*

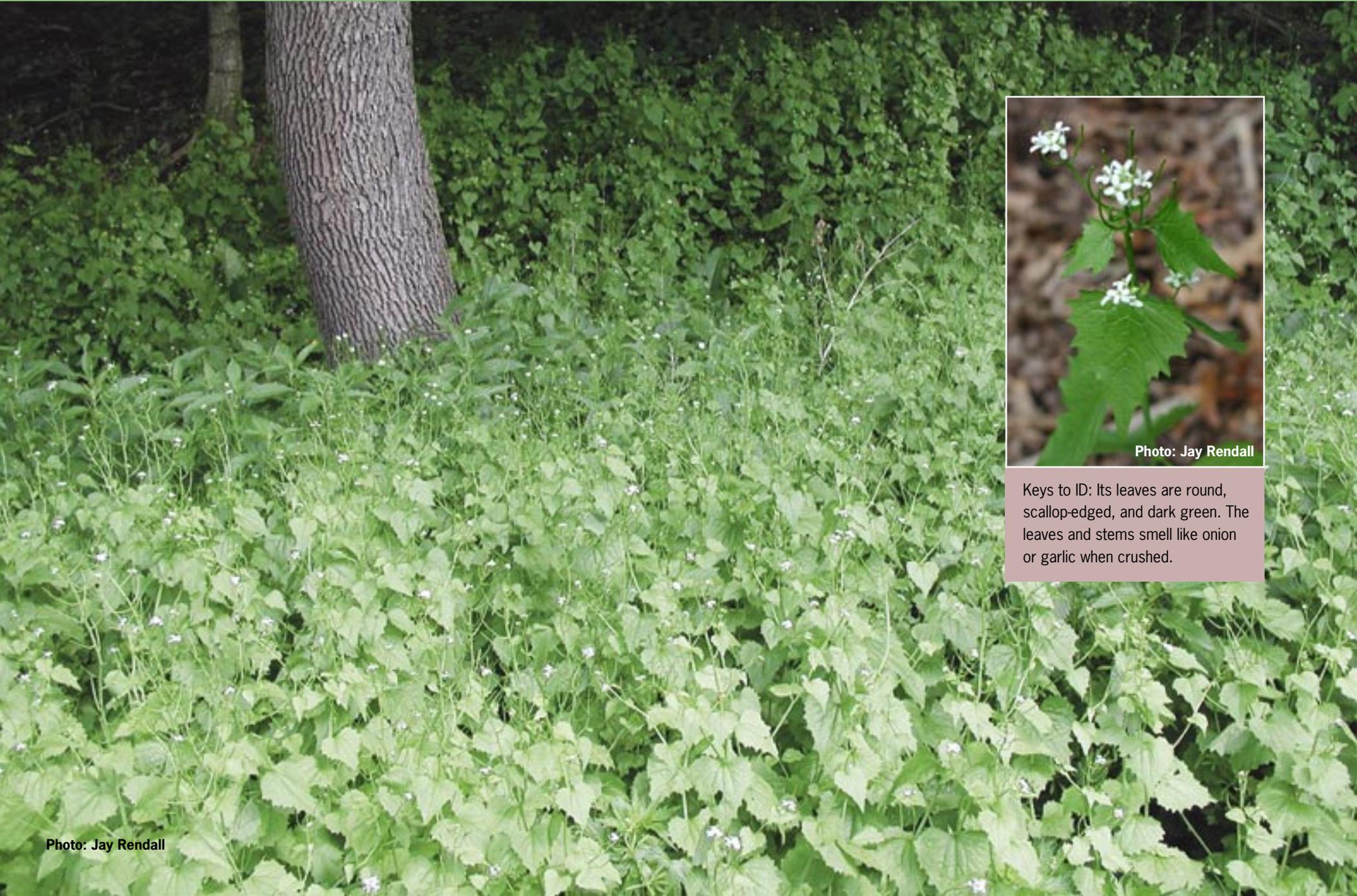


Photo: Jay Rendall

Keys to ID: Its leaves are round, scallop-edged, and dark green. The leaves and stems smell like onion or garlic when crushed.

Garlic Mustard

Alliaria petiolata

Species: Garlic mustard is a terrestrial, biennial plant.

Origin: It is native to Europe.

Impacts: Garlic mustard invades high quality woodlands as well as upland and floodplain forests.

The invaded sites undergo a decline on native herbaceous cover within 10 years. It alters habitat for native insects and, thereby, birds and mammals.

Status: It was first recorded in 1933 and is now found in central and southeastern Minnesota and a few locations in northern Minnesota.

Where to look: It grows in the forest understory or along forest edges but is also able to invade undisturbed forest habitats.

Regulatory classification (agency): Garlic mustard is a *prohibited noxious weed* in Minnesota (MDA and counties).

Means of spread: Seeds can be transported by humans on boots and clothing, by mowing, in automobiles and trains. Birds, rodents, and whitetail deer are likely seed dispersers in woodland habitats.

How can people help? Report populations of garlic mustard; hand pull small populations.

Management information: Contact DNR for management information.

April

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1 <i>April Fool's Day</i>	2
3 <i>Daylight Savings Begins</i>	4	5	6	7	8	9
10	11	12	13	14	15	16
		Minnesota Invasive Species Advisory Council Meets				
17	18	19	20	21	22 <i>Earth Day</i>	23
24	25	26	27	28	29	30

Gypsy Moth *Lymantria dispar* (Linnaeus)



Photos: Peter Dziuk

Keys to ID: 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 and cannot fly. Eggs are laid in quarter-sized, buff-colored, velvety masses.

Gypsy Moth

Lymantria dispar (Linnaeus)

Species: A moth in the family Lymantriidae.

Origin: A European species, it was introduced into the United States in 1869.

Impacts: It is rated as the most serious tree pest of North America, capable of defoliating over 300 different species of trees and shrubs.

Status: There are no known established populations in Minnesota.

Where to look: Adult moths can be readily detected using pheromone baited sticky traps. Egg masses can be found on outdoor articles.

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

Means of spread: Natural spread is limited to a few miles per year. It can be transported great distances through human activities.

How can people help? If traveling through an infested area, inspect all outdoor articles and remove any gypsy moth stages present. Do not transport firewood or uncertified nursery stock. Report any suspect finds to the Minnesota Department of Agriculture.

May

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	2	3	4	5	6	7
8 <i>Mother's Day</i>	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30 <i>Memorial Day</i>	31				

Emerald Ash Borer *Agrilus planipennis* Fairmaire



Photos: David Cappaert

Keys to ID: The metallic green adult can be difficult to find. However, the distinctly segmented larva is relatively easy to locate by peeling back the bark of infested trees. D-shaped exit holes and serpentine galleries under the bark indicate emerald ash borer activity.



Emerald Ash Borer

Agrilus planipennis Fairmaire

Species: A beetle in the family Buprestidae.

Origin: Native to Asia, it was discovered in 2002 in southeastern Michigan. It has infested a large part of southeast Michigan and has been found in northeast Indiana, northwest Ohio, and Windsor, Canada.

Impacts: This beetle causes high mortality in ash trees.

Status: It is not known to exist in Minnesota. It is viewed as a significant threat to ash trees in Minnesota and throughout North America.

Where to look: Look for signs on ash trees that have recently died or show signs of decline and poor health.

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

Means of spread: It is spread by humans moving infested wood. Natural movement is slow, probably only a few miles a year.

How can people help? Avoid bringing firewood into the state. Never move uncertified nursery stock across state lines. Report any suspect finds to the Minnesota Department of Agriculture.

June

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1 <small>Invasive Species Awareness Month Begins</small>	2	3	4
5	6	7	8	9	10	11
12	13	14 <small>Flag Day</small>	15	16	17	18
19 <small>Father's Day</small>	20	21 <small>Summer Begins</small>	22	23	24	25
26	27	28	29	30		

Eurasian watermilfoil *Myriophyllum spicatum*



Photo: Minnesota DNR

Keys to ID: Eurasian watermilfoil has whorls of four once-pinnately dissected leaves, which usually have 12 to 21 pairs of leaflets.

Eurasian watermilfoil

Myriophyllum spicatum

Species: Eurasian watermilfoil is a rooted, submersed aquatic plant.

Origin: It is native to Eurasia and was likely unintentionally introduced by transport on a trailered boat.

Impacts: It can form dense mats on the water surface, which may interfere with the use of surface waters.

Status: Eurasian watermilfoil was discovered in Lake Minnetonka in 1987, and is known to occur in 160 waterbodies in Minnesota as of November 2004.

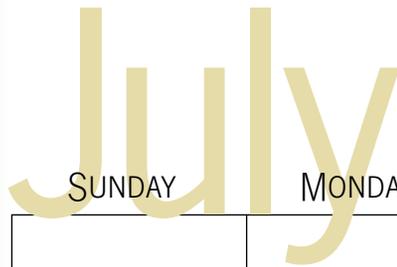
Where to look: It is found in shallow areas—generally less than 15 feet deep—of lakes and ponds.

Regulatory classification (agency): Eurasian watermilfoil is a *prohibited invasive species* (DNR).

Means of spread: It is often incidentally transported on water recreation equipment.

How can people help? Remove all aquatic plants before transporting boats and equipment from one waterbody to another.

Management information: Contact DNR Fisheries or DNR Invasive Species Program.



SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1	2
3	4 <i>Independence Day</i>	5	6	7	8	9
10	11	12 <small>Minnesota Invasive Species Advisory Council Meets</small>	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Zebra Mussel *Dreissena polymorpha*



Photo: Deborah Rose

Keys to ID: Zebra mussels are $\frac{1}{4}$ to $1\frac{1}{2}$ inches long and have D-shaped shells with alternating black to brownish colored stripes. They attach to hard surfaces using sticky (byssal) threads.



Photo: Center for Great Lakes and Aquatic Sciences

Zebra Mussel

Dreissena polymorpha

Species: Zebra mussels are small barnacle-like aquatic animals.

Origin: Native to Eastern Europe/Western Russia, they first arrived in the Great Lakes about 1988 in the ballast discharge water of foreign ships.

Impacts: Zebra mussels foul beaches, can cut swimmer's and dog's feet, interfere with food webs, and clog water intakes. They are linked to fish and wildlife die-offs.

Status: They are established in Minnesota and were first found in the Duluth/Superior Harbor in 1989.

Where to look: Examine boat hulls, swimming platforms, docks, rocks, and other hard surfaces along the shoreline of lakes, rivers, and streams.

Regulatory classification (agency):

It is a *prohibited invasive species* in Minnesota (DNR).

Means of spread: They can spread by attaching to boat hulls, aquatic plants, fishing equipment, nets, boat lifts, or in infested water.

How can people help? Remove visible zebra mussels and aquatic plants, and drain water before transporting boats and equipment from one waterbody to another. Report new infestations.

Further information: Contact the DNR Invasive Species Program, or the University of Minnesota Sea Grant Program, Aquatic Invasive Species Information Center.

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			

Soybean aphid *Aphis glycines*



Photo: Rob Venette

Keys to ID: It is the only aphid to reproduce on soybean.

Soybean aphid

Aphis glycines

Species: Soybean aphid is an insect that alternates between buckthorn (winter host) and soybean (primary summer host). The aphid may complete 17-18 generations per year.

Origin: It is native to Asia and may have arrived from Japan or China. It was first detected in Minnesota in 2000.

Impacts: Soybean aphids reduce yields of soybean plants. High aphid numbers also contribute to a build-up of populations of multicolored Asian lady beetle.

Status: It is established in Minnesota.

Where to look: Look on soybean plants, typically on stems and underside of leaves.

Regulatory classification: It is not a regulated pest.

Means of spread: Winged forms of the aphid fly and are carried by the wind.

How can people help? Growers should scout fields for the aphid.

Further information: Contact Minnesota Extension Service.

September

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1	2	3
4	5 <i>Labor Day</i>	6	7	8	9	10
11 <i>Grandparents' Day</i>	12	13	14	15	16	17
18	19	20	21	22 <i>Fall Begins</i>	23	24
25	26	27	28	29	30	

Multicolored Asian lady beetle *Harmonia axyrids*



Photo: Rob Venette

Keys to ID: Its color and the number of spots are not reliable ways of identification. Look for a black M-shaped mark near the head.

Multicolored Asian lady beetle

Harmonia axyrids

Species: This ladybug is a predator of many soft-bodied insects.

Origin: Native to eastern Asia, it was accidentally or intentionally introduced in southern states. It was first reported in Minnesota in 1994.

Impacts: It reduces densities of some insect pests, but also attacks other ladybugs and butterflies. This insect can be a severe nuisance as it moves into homes and structures in the fall. It can bite and cause allergic reactions in some people. It is becoming a pest to fruit growers in the state.

Status: It is established in Minnesota.

Where to look: It is common in many habitats, but most abundant where aphids or other prey are plentiful.

Regulatory classification: It is not a regulated pest.

Means of spread: This ladybug is spread primarily through flight. It can be purchased on the Internet from some distributors.

How can people help? Because it is so widespread, it is not necessary to report occurrences.

Further Information: Contact Minnesota Extension Service.

October

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1
2	3	4	5	6	7	8
9	10	11 <small>Minnesota Invasive Species Advisory Council Meets</small>	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30 <small>Daylight Savings Ends</small>	31 <small>Halloween</small>					

Common Buckthorn *Rhamnus cathartica*



Photo: Jay Rendall

Keys to ID: Leaves are dark, egg-shaped, and pointed at the tip, with finely toothed edges. There are 3-5 pair of curved leaf veins. Leaves stay green late into fall.

Common Buckthorn

Rhamnus cathartica

Species: Common buckthorn is a shrub or small tree.

Origin: It is native to Europe.

Impacts: Buckthorn out-competes native plants for nutrients, light, and moisture, and degrades wildlife habitat. It contributes to erosion by shading out other plants that grow on the forest floor. Buckthorn serves as host to other pests such as crown rust fungus and the Asian soybean aphid. It lacks “natural controls” like insects or disease that would curb its growth.

Status: Buckthorn became established in Minnesota in the 1930s, and is found statewide.

Where to look: It grows in the forest understory or along forest edges, but it can also grow in prairies and savannahs.

Regulatory classification (agency): Buckthorn is a *restricted noxious weed* in Minnesota (MDA and counties).

Means of spread: Seeds are eaten by birds and deposited in new locations. Buckthorn was once sold as an ornamental plant.

How can people help? Remove buckthorn from your property; replace with native plant species.

Management information: For management recommendations, visit <http://www.dnr.state.mn.us/invasives/terrestrialplants/woody/buckthorn/control.html>.

November

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1	2	3	4	5
6	7	8	9	10	11 <i>Veteran's Day</i>	12
13	14	15	16	17	18	19
20	21	22	23	24 <i>Thanksgiving Day</i>	25	26
27	28	29	30			

Round Goby *Neogobius melanostomus*



Photo: Dave Jude

Keys to ID: They are usually 3-6 inches long and mostly slate gray in color. There is a single scallop-shaped pelvic fin and a black spot on the dorsal fin.

Round Goby

Neogobius melanostomus

Species: Round gobies are small bottom-dwelling fish.

Origin: Native to the freshwater region of the Black and Caspian Seas, they spread to the Great Lakes in the ballast water discharge of foreign ships.

Impacts: They displace native fish, eat the eggs and young of native fish, and overtake habitat.

Status: First found in the Duluth-Superior Harbor in 1995, they have not been found in inland waters.

Where to look: They live in lakes and rivers. Anglers should examine small fish that they catch. They hide along riprap and cobble areas.

Regulatory classification (agency): They are a *prohibited invasive species* in Minnesota (DNR).

Means of spread: Round gobies can spread through the use and disposal of live bait.

How can people help? Do not use as live bait. Remove non-bait minnows, crayfish, and plants from bait containers. Report new infestations.

Further information: Contact the DNR Invasive Species Program, or the University of Minnesota Sea Grant Program, Aquatic Invasive Species Information Center.

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 <small>Winter Begins</small>	22	23	24
25 <small>Christmas Day</small>	26	27	28	29	30	31

For information about
invasive species in
Minnesota contact:

Aquatic Plants and Animals

Minnesota Department of
Natural Resources—Invasive
Species Program
651-296-2835

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

US Fish and Wildlife Service
612-713-5114



Curly-leaf pondweed



Eurasian earthworms



Spotted knapweed



Garlic mustard



Gypsy moth



Emerald ash borer

Terrestrial Plants and Insects

Minnesota Department of
Agriculture—Invasive Species
Unit
651-296-8448

USDA—Animal and Plant
Health Inspection Service
612-725-1722



Eurasian watermilfoil



Zebra mussel



Soybean aphid



Asian lady beetle



Common buckthorn



Round goby

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