

Aquatic Roots

Study Units

Unit 2: Aquatic Life; Unit 3: The World in a Pond; Unit 4: People, Land, and Water

Supplemental Information

People have always transported plants and animals from one area to another. Some transplants have no noticeable impact on native ecosystems, but others have become serious problems because they upset the ecological balance of a habitat. See the *Aquatic Invaders* fact sheet for information about aquatic exotics currently invading Iowa's aquatic resources which are causing (or may cause) problems for native systems. The *Introduced Animals* and *Introduced Plants* fact sheets include a list of some plants and animals introduced into the U.S. and/or Iowa.

Teaching Suggestions

Follow the instructions in the guide. Use the included information to form a list of local exotic plants and animals. Students may research exotic species using the *Biodiversity of Iowa: Aquatic Habitats* CD, in the library, or on the Internet. Go through the evaluation in the guide.

Evaluation

See the guide.

Student Materials

None

Teacher Aids

Fact Sheets: Aquatic Invaders; Introduced Animals; Introduced Plants
CD: Biodiversity of Iowa: Aquatic Habitats

Additional Materials

Aquatic Exotics (VHS; produced by the MN DNR and provided by the IDNR Aquatic Education Program to Area Education Agencies)

Iowa Department of Natural Resources. You Can Help Stop the Spread of Eurasian Watermilfoil. Des Moines

Iowa Department of Natural Resources. You Can Help Stop the Spread of Zebra Mussels. Des Moines

Various field guides for plants and animals (often tell if plant or animal is introduced, whether or not it is considered to be a pest, etc.)

www.iowadnr.gov/fish/index.html: IDNR Fisheries Bureau website (includes an information section about exotic aquatic species; several other internet sources for specific species)

Fact Sheet: Aquatic Invaders

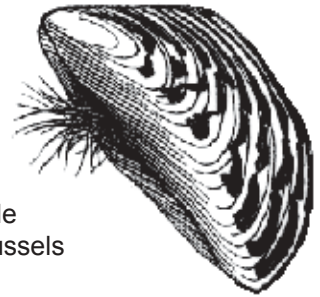
Zebra mussels

Zebra mussels are small clams (1/2 - 2 inches) that attach to any solid object with tufts of fiber called “byssal threads.” They are native to the Caspian Sea region of Asia and were introduced into North America in the mid 1980s via transoceanic ships that discharged ballast water into Lake St. Claire, near Detroit. Zebras have extended their range to parts of all the Great Lakes and much of the Mississippi River, and are beginning to infest inland lakes as well.

A single zebra mussel female can produce more than 30,000 eggs and they mature rapidly, making them difficult to control. A body of water may have no detectable zebra mussels one year, and have its bottom covered with them the next. Zebra mussels grow in thick mats on each other and other shells. Colonies can suffocate freshwater mussel beds. Several formerly productive beds already have been decimated by zebra mussels.

Large numbers of zebra mussels can filter all the water in a lake or stream, removing plankton (tiny plants and animals) that larval fish eat. Since zebras filter water so effectively, they increase water clarity. This results in increased aquatic vegetation, which has led to taste and odor problems in drinking water supplies.

Some ducks—scaup, canvasbacks, old squaws, and mallards—may feed on zebra mussels. Freshwater drum and yellow perch also have been seen eating juveniles, but predation is not controlling them.



Zebra mussel

Eurasian watermilfoil

Eurasian watermilfoil accidentally was introduced from Europe. Its spread westward into inland lakes and streams primarily is attributed to boats, with some spreading caused by birds. It reached the Midwest between the 1950s and 1980s and was first discovered in Iowa in 1992, in Hancock County’s Crystal Lake. By 1993, the 260-acre lake was taken over by the plant and was unusable from mid-July until fall. It has since been reported in St. Benedict pond, Walnut Creek Marsh, Kounty Pond, Wilson Grove Pond, and Snyder Bend Lake. To date, all infestations in Iowa have been eradicated successfully with the exception of the Mississippi River.

In nutrient-rich lakes, it can form thick underwater stands of tangled stems and vast mats of vegetation at the water’s surface. In shallow areas, the plant can interfere with boating, fishing, and swimming. The plant’s floating canopy also can crowd out important native water plants.

A single segment of stem and leaves can take root and form a new colony. Fragments clinging to boats and trailers can spread the plant from lake to lake. Mechanical clearing of weed beds for beaches, docks, and landings creates thousands of new stem fragments that can drift with the wind and current.

Currently it is illegal in Iowa to 1) transport Eurasian watermilfoil on a public road, 2) place a trailer or launch a watercraft with Eurasian watermilfoil attached in public waters, or 3) operate a watercraft in a marked Eurasian watermilfoil area.



Eurasian watermilfoil

You can help control the spread of this aquatic invader:

- Clean all aquatic vegetation from your boat and trailer before leaving any boat ramp.
- Remove all plants and other debris from boats, motors, trailers, and other equipment before launching—especially if you have been in an infested area.
- Dispose of any plant debris away from the lake.
- Report any aquatic vegetation you suspect is Eurasian watermilfoil to DNR fisheries personnel.
- Pass the word about Eurasian watermilfoil to your friends and neighbors.

Fact Sheet: Aquatic Invaders (page 2)

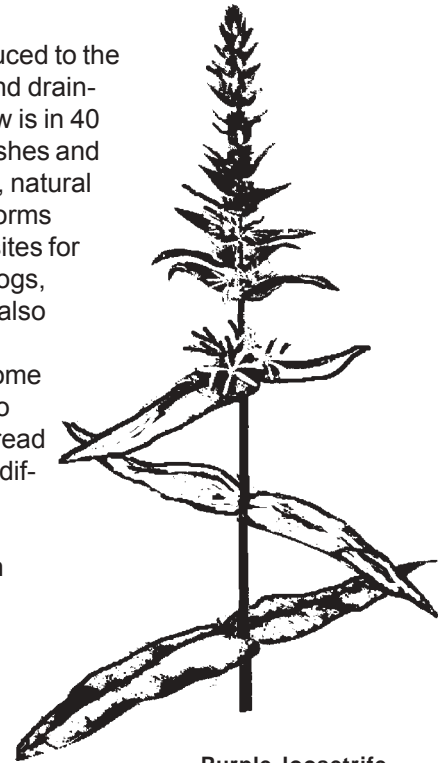
Purple loosestrife

Purple loosestrife is a wetland plant from Europe and Asia. It was introduced to the east coast of North America in the 1800s. It spread along roads, canals, and drainage ditches and later was distributed as an ornamental garden plant. It now is in 40 states, Iowa included, and in all Canadian border provinces. It invades marshes and lake shores, replacing cattails and other wetland plants. In some locations, natural cattail marshes have been overtaken completely by loosestrife. The plant forms dense, impenetrable stands that are unsuitable as cover, food, or nesting sites for native wetland animals including ducks, geese, rails, bitterns, muskrats, frogs, toads, and turtles. Many rare and endangered wetland plants and animals also are at risk.

Purple loosestrife thrives on disturbed, moist soils, often invading after some type of construction activity. Seeds escape from gardens and nurseries into wetlands, lakes, and rivers. Once in aquatic systems, seeds are easily spread by moving water and wetland animals. Eradicating an established stand is difficult because of the enormous number of seeds the plant produces (often over two million seeds from a single adult plant annually). The plant also is able to sprout from its extensive underground root network and from broken stems that fall onto the ground or in the water.

A major reason for purple loosestrife's expansion is that it has no natural controls in North America. Several European insects that attack only purple loosestrife are being tested as possible long-term biological controls of the plant.

In Iowa, the plant has spread along the Mississippi River, but it has been controlled fairly effectively in inland marshes and waterways. The DNR has spent a great deal of time and money to keep purple loosestrife out of wildlife and waterfowl habitat areas.



Purple loosestrife

Other Invaders...

Several other "exotics" are showing up in Iowa waters, or are in neighboring states. It is not yet known how they will impact our aquatic ecosystems.

Invertebrates

The **spiny water flea** is small, about half an inch long with a long, sharp, barbed tail spine. It is native to Europe, but can now be found throughout the Great Lakes and in many inland lakes and waterways. **Daphnia lumholzi** is a microscopic animal that is difficult to detect. It is native to Asia and Africa, but became established (or noticed) by biologists in Missouri and Texas in 1990.

Fish

The **round goby** has not yet been sighted in Iowa waters, but this fish is increasingly common in the Great Lakes. It is native to the Black and Caspian Seas. The **rudd** is a member of the minnow family native to Eurasia, but now is in Illinois. The **ruffe** is a small member of the perch family that is native to central and eastern Europe. It was introduced in Minnesota and is spreading to other rivers and bays around Lake Superior. Four species of **carp** may become problems in Iowa waters: grass, bighead, silver, and black carp.

For more information about some of these invaders, check out the IDNR Fisheries home page at: www.iowadnr.com (click on "Fish and Fishing").

Fact Sheet: Introduced Animals

Below are some animals that have been introduced into areas in the United States other than their native ranges. (This is not a complete list.) Many have become nuisances, or even serious pests. Feral animals (domestic animals that have become wild again) have caused serious problems for many native animals.

INVERTEBRATES:

Insects:

commercial silk moths
German cockroach
gypsy moth
killer bees
oriental cockroach

Other Invertebrates:

spiny water flea
zebra mussel

FISH:

bighead carp
brown trout
common carp
goldfish
morone hybrid (wiper)
rainbow trout
round goby
ruffe
rudd
saugeye
silver carp
spotted bass
tiger musky
white amur (grass carp)

BIRDS:

back-necked swan
bar-headed goose
black francolin
black swan
blue-gray tanager
budgerigar
canary-winged parrot
chestnut munia
Chinese goose
chukar

BIRDS: (continued)

common waxbill
coternix
Egyptian goose
Eurasian tree sparrow
European goldfinch
European starling
golden pheasant
gray-necked wood rail
gray partridge
hill mynah
house sparrow
Java sparrow
Mandarin duck
monk parakeet
muskovy
pheasant
plain chachalaca
red-crested cardinal
ringed turtle dove
rock dove (domestic pigeon)
southern lapwing
spotbill duck
spotted munia
troupial
white-winged dove

MAMMALS:

domestic burro
domestic cat
domestic cow
domestic dog
domestic horse
domestic pigs
house mouse
Norway rat
nutria

Fact Sheet: Introduced Plants

Following are some plants introduced into Northeastern and North-Central United States. Many are nuisance or “weed” species that compete with, or even replace, native plants.

alfalfa	comfrey	everlasting pea
alsike clover	common burdock	fall dandelion
Asiatic dayflower	common chickweed	feverfew
barley	common dandelion	field bindweed
Barnaby’s thistle	common groundsel	field garlic
barnyard grass	common morning glory	field mustard
Bermuda grass	common mullein	field pansy
birdsfoot trefoil	common nightshade	field pennycress
bitterdock	common plantain	field scabious
blackberry lily	common sorrel	field sow-thistle
black bindweed	common sow-thistle	flax
black knapweed	common St. Johnswort	flower-of-an-hour
black mustard	common tansey	forking catchfly
black swallowwort	corn cockle	fumitory
bladder	corn gromwell	galinsoga
blessed thistle	corn salad	garden loosestrife
bloody cranesbill	cow vetch	garlic mustard
blue field madder	crab grass	goose grass
bouncing bet	creeping bellflower	gorse
branched broomrape	creeping buttercup	grape hyacinth
bristly foxtail	creeping wood sorrel	great burdock
broom	crown vetch	great knapweed
broom knapweed	curled dock	green amaranth
buckwheat	cvinquefoil	green foxtail
bugle	cypress spurge	ground ivy
bulbous buttercup	dame’s rocket	hairy vetch
bull thistle	day lily	hare’s-ear mustard
butter and eggs	deptford pink	heal-all (self-heal)
caltrops	dove’s foot cranesbill	heather
Canada bluegrass	downy chess	hedge mustard
Canada thistle	dusty miller	helleborine
caraway	dyer’s greenweed	hemp-nettle
catnip	early wintercress	henbit
cat’s ear	elecampane	high mallow
celandine	English plantain	hoary alyssum
centaury	English rye grass	horn poppy
charlock	erect bugle	horseradish
cheeses	eulalia	hound’s tongue
chickory	Eurasian watermilfoil	hyssop
Chinese (Indian) mustard	European beggarticks	Indian strawberry
clasping-leaved mullein	European mallow	ivy-leaved morning glory
clustered bellflower	European vervain	Japanese brome
coltsfoot	evening lychnis	Japanese honeysuckle

Fact Sheet: Introduced Plants (page 2)

Jerusalem oats	prickly mallow	sweet William catch-fly
jimsonweed	prickly poppy	tall buttercup
Kenilworth ivy	prince's feather	tall oats grass
Kentucky bluegrass	prostrate knotweed	tansy ragwort
king devil	purple loosestrife	teasle
knawel	purslane	thyme-leaved sandwort
lady's thumb	rabbit's foot clover	tiger lily
lamb's quarters	ragged robbin	Timothy
lamb succory	reed canary grass	true forget-me-not
leafy spurge	red bartsia	tumble mustard
lesser broomrape	red campion	tyrol knapweed
lesser celandine	red clover	valerain
lesser snapdragon	redtop (in part)	velvet grass
lesser stitchwort	red turtlehead	velvet leaf
live forever	roadside peppergrass	viper's bugloss
maiden pink	rye	water mint
marijuana	rough-fruited cinquefoil	weak sunflower
marsh mallow	scarlet lychnis	welted thistle
marsh thistle	scarlet pimpernell	wheat
Mayweed	scentless chamomile	white clover
meadow cranesbill	Scotch thistle	white mullein
meadow fescue	sheep fescue	white mustard
Mexican tea	sheep sorrel	white sweetclover
moneywort	shepherd's purse	wild bedstraw
motherwort	small bugloss	wild carrot
moth mullein	small red morning glory	wild chamomile
mouse-ear chickweed	smooth brome	wild parsnip
mouse-ear hawkweed	smooth hawksbeard	wintercress
mullein pink	smoothish hawkweed	wood strawberry
multiflora rose	sneezeweed yarrow	wooly burdock
musk mallow	soft chess	wrinkled rose
nipplewort	spearmint	yarrow
night-flowering catchfly	spider flower	yellow bedstraw
nightshade	spiny clotbur	yellow iris
nodding thistle	spiny-leaved sowthistle	yellow vetchling
oats	spring vetch	zig-zag clover
orange hawkweed	spotted knapweed	
orchard grass	star of Bethlehem	
ox-eye daisy	stinging nettle	
oyster plant	stink grass	
patience dock	stinking groundsel	
peppermint	stonecrop	
pineapple weed	storksbill	
poison hemlock	sweetbrier	
prickly lettuce	sweet vernal grass	

Major source used in compiling this list:

A Field Guide to the Flowers of the North-eastern and North-Central United States:
Peterson Field Guide Series