Plants

Vertebrates

# Invasive Species

*California's Environment, Specialty Crops, Resources & Habitat are Worth Protecting*

Arthropods

Invertebrates

Diseases

**The Invasive Species Council of California** represents the highest level of leadership and authority in state government regarding invasive species. This inter-agency council helps to coordinate and ensure cost-efficient, complementary, environmentally sound and effective state activities regarding invasive species.

INVASIVE SPECIES COUNCIL OF CALIFORNIA

www.iscc.ca.gov

# INVASIVE SPECIES COUNCIL OF CALIFORNIA

The ISCC has developed a list of invasive species that threaten California's specialty crops, environment and habitat. This booklet provides examples from the list, which is available at **www.iscc.ca.gov.**

**A.G. Kawamura**
**Secretary**

*California Department of Food and Agriculture*

ISCC Chairman

"We must do all we can to fight invasive species. They affect everything from the environment to our food supply to the health of our families and pets. Working together, I believe we can minimize their destructiveness."

**Lester A. Snow**
**Secretary**

*California Natural Resources Agency*

ISCC Vice Chair

"Invasive quagga and zebra mussels pose a dramatic economic and environmental threat to California. The ISCC and CISAC provide a platform for developing a strategy and state actions to prevent and manage impacts of these and other invasive species."

**Linda S. Adams**
**Secretary**

*California Environmental Protection Agency*

ISCC Member

"Our mission is to restore, protect and enhance the environment, to ensure public health, environmental quality and economic vitality. Invasive species pose a persistent and pervasive threat to that mission."

**Dale A. Bonner**
**Secretary**

*California Business, Transportation and Housing Agency*

ISCC Member

"The ISCC and its member agencies and advisors must collaborate to seek out available funding for detection, eradication and education about invasives. The economic consequence of invasive species represents a significant threat."

**Kim Belshé**
**Secretary**

*California Health and Human Services Agency*

ISCC Member

"The new list of invasive species is a beginning point that will allow us to improve the quality, safety and sustainability of California's food supply."

**Matthew Bettenhausen**
**Secretary**

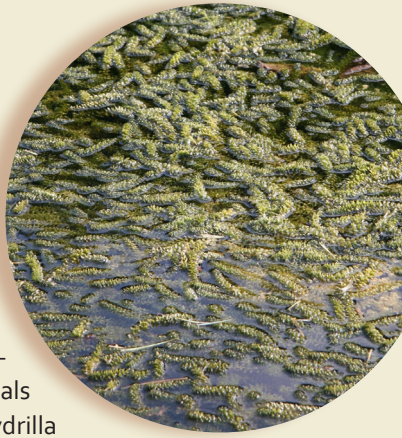
*California Emergency Management Agency*

ISCC Member

"At Cal EMA we respond to sudden emergencies all the time. Some catastrophies, though, are incremental and therefore less obvious. Invasive species impact Californians' everyday safety and must be addressed."

# Invasive Plants

## EXAMPLE Hydrilla*



*Hydrilla verticillata* is an invisible menace — until it fills the lake or river that it infests, "topping out" at the surface. When hydrilla invades, native submersed plants are shaded out by its thick mats, outcompeted, and eliminated. Hydrilla clogs irrigation and flood-control canals and essential water control pumping stations. Hydrilla also interferes with boating, swimming and fishing. Dense infestations can even alter water chemistry and oxygen levels.

Robert Vidéki, Doronicum Kft., Bugwood.org

## Highlights from the List of Invasive Plants

***Giant reed,** *Arundo donax*, thick stems grow up to 20 feet, blocking waterways; casts dense shade that can displace native plants.

***Japanese dodder,** *Cuscuta japonica*, aggressive, parasitic plant that can completely engulf and kill host crops, ornamental trees and plants.

**Mediterranean strain caulerpa,** *Caulerpa taxifolia*, a seaweed that threatens native sea grass meadows as well as fish breeding and feeding grounds.

***Medusahead,** *Taeniatherum caput-medusae*, winter annual grass that crowds out native species and reduces forage for livestock.

***Perennial pepperweed,** *Lepidium latifolium*, a perennial herb that grows aggressively, forming dense colonies that exclude native species.

***Red sesbania,** *Sesbania punicea*, South American native small tree with pea-like red-orange flowers; poisonous to both people and animals.

***Tamarisk or saltcedar,** *Tamarix ramosissima*, one large plant can absorb up to 200 gallons of water per day, threatening the water supply.

***Water hyacinth,** *Eichhornia crassipes*, forms dense colonies that deprive native species of sunlight; also clogs water delivery systems.

**Witchweed,** *Striga asiatica*, a parasitic plant that infests several crops, depleting nutrients, contaminating harvests and reducing yields.

**Currently found in California (June 2010).*

# Invasive Vertebrates

EXAMPLE

## Brown Treesnake

Gordon Rodda, USGS

*Boiga irregularis* is an opportunistic feeder that can eradicate native forest birds, altering the food chain and causing extensive ecological and economic damage. As bird populations decline, the snake turnes its focus to lizards. Rats, mice, domestic birds, and bird eggs make up the remainder of the brown treesnake's diet.

## Highlights from the List of Invasive Vertebrates

*__African clawed frog,__ *Xenopus laevis,* a predator that drives down populations of native frogs and other creatures by eating their young.

*__European fallow deer,__ *Cervus damus,* can reach very high densities in forests and near agriculture, eating tree shoots and damaging crops.

*__Feral pig,__ *Sus scrofa,* native to Europe and Asia, these mammals pose ecological, economic, aesthetic, medical and veterinary threats.

__Japanese white eye,__ *Zosterops japonica,* a small bird that can carry avian parasites that infect native birds; also spreads seeds of invasive plants.

*__Norway rat,__ *Rattus norvegicus,* spreads diseases affecting humans, including plague, murine typhus, leptospirosis, ricketsialpox and others.

__Nutria,__ *Myocaster coypus,* a voracious herbivore that carves up marshland plants; their burrowing habit also destabilizes waterside banks.

__Monk parakeet,__ *Myiopsitta monachus,* breeds colonially in nests up to the size of a small automobile; can damage specialty crops and native species.

*__Snapping turtle,__ *Chelydra serpentine,* often dumped by pet owners in ponds and creeks; competes with native species for food and habitat.

*__Water snakes,__ *Nerodia species,* predators that primarily prey upon native fish and amphibians; some can strike or bite.

**Currently found in California (June 2010).*

# Invasive Arthropods

## EXAMPLE Mediterranean Fruit Fly

*Ceratitis capitata* is among the world's most destructive pests of specialty crops, doing its damage when the female fly pierces the soft skin of ripening fruit to lay eggs in the puncture. The eggs hatch into larvae (maggots), which feed on the fruit pulp. Like other fruitborne pests, Medflies are constantly being brought into California through fruit smuggling, package shipments and tourists' carry-on luggage.

USDA ARS

## Highlights from the List of Invasive Arthropods

**Asian longhorned beetle,** *Anoplophora glabripennis,* tunnels through hardwoods, killing timber, nursery stock, shade trees and others.

**Cactus moth,** *Cactoblastis cactorum,* feeds on and can kill prickly pear cactus, a commercially valuable plant that is also vital to desert ecosystems.

**Chilli thrips,** *Scirtothrips dorsalis,* defoliates more than 100 crop plants including peppers, strawberries and tomatoes, resulting in reduced yields.

***European grapevine moth,** *Lobesia botrana,* larvae of multiple generations feed primarily on grapes and their flowers, exposing clusters to rot and disease.

**Gypsy moth,** *Lymantria dispar,* high populations defoliate oak, aspen and other trees; successive years of defoliation may result in tree mortality.

**Japanese beetle,** *Popillia japonica,* skeletonizes leaves of 200+ plants including rose bushes, grapevines, crape myrtles; also feeds on turfgrass roots.

**Redbay ambrosia beetle,** *Xyloborus glabratus,* tunnels through redbay, sassafras and related trees, spreading the deadly *Raffaelea lauricola* fungus.

***Red imported fire ant,** *Solenopsis invicta,* painful stings are a threat to people, livestock, pets and wild animals; often spread with beehives.

***Vine mealybug,** *Planococcus ficus,* overlapping generations excrete honeydew that promotes mold on grape clusters and defoliation of grapevines.

**Currently found in California (June 2010).*

# Invasive Invertebrates

infested pipe

## EXAMPLE Quagga Mussel

*Dreissena rostriformis bugensis* is both prolific and adaptive. Often spread as microscopic larvae in the bilges of private and commercial boats, quaggas quickly colonize new bodies of water. They alter the local ecosystem and food chain by filtering out substantial amounts of phytoplankton, decreasing chlorophyll concentrations. They also produce concentrated waste that exposes wildlife to unnaturally high levels of organic pollutants.

## Highlights from the List of Invasive Invertebrates

*__Asian clam,__ *Corbicula fluminea,* freshwater species that can self-fertilize, producing up to 2,000 juveniles per day; can biofoul power plants, canals.

**Burrowing nematode,** *Radopholus similis,* plant parasite destroys roots, degrading plants' physical stability and nutrient/water uptake, reducing yields.

*__Chinese mitten crab,__ *Eriocheir sinensis,* competes with native species, and its burrowing nature damages embankments and drainage systems.

**Golden mussel,** *Limnoperna fortunei,* highly adaptable, reproduces rapidly; attaches to native bivalves, suffocating, starving and killing them.

**Golden nematode,** *Globodera rostrochinensis,* primarily infests roots of potatoes and tomatoes, depriving plants of nutrients and reducing yields.

*__Green crab,__ *Carcinus maenas,* predator of native clams, competes with other natives for food, threatens commercially valuable bivalves and native crabs.

*__New Zealand mudsnail,__ *Potamopyrgus antipodarum,* tiny snail (dozens fit on a dime) reaches phenomenal densities, eats algae, impacts natives and fisheries.

**Rusty crayfish,** *Orconectes rusticus,* displaces/hybridizes with native crayfish, disrupts food chain, consumes aquatic plants that are habitat for natives.

*__Zebra mussel,__ *Dreissena polymorpha,* clogs water systems and crowds out natives; especially prolific — one female can release up to one million eggs.

**Currently found in California (June 2010).*

# Invasive Diseases

EXAMPLE

## Plum Pox

Plum pox, *Potyvirus species,* is a devastating viral disease of stone fruit. Different strains of the plum pox virus infect a variety of stone fruit species (plums, peaches, almonds, cherries, etc.). Plum pox poses no danger to consumers, but it can ruin the marketability of stone fruit by causing bitterness and deformities. The only way to manage the disease is to destroy all infected trees, causing significant economic losses.

John Hammond

## Highlights from the List of Invasive Diseases

**Bacterial blight of grape,** *Xylophilus ampelinus,* readily transmitted by pruning tools and cuttings, this pathogen can lead to serious harvest losses.

**Citrus variegated chlorosis,** *Xylella fastidiosa,* severe strain of a bacterium that causes wilt/scorch in citrus; other strains affect crops such as grapes, almonds.

**Huanglongbing,** *Candidatus liberibacter,* citrus disease spread by the Asian citrus psyllid; causes leaf yellowing, misshapen/bitter fruit, and kills the tree.

**Laurel wilt,** *Raffaelea lauricola,* a fungus spread to host trees by the redbay ambrosia beetle; can kill an avocado tree in a few months.

**Oak wilt,** *Ceratocystis fagacearum,* a fungal disease that kills oaks by blocking water-conducting tissues; can cause entire crown to wilt before a tree dies.

*__Sudden oak death,__ *Phytophthora ramorum,* a plant pathogen that kills oaks; it damages other trees and can infect more than 100 plant species.

**Tomato torrado virus,** *Begomovirus (ToTV),* associated with whitefly infestations, this newly identified virus causes distinct, burn-like symptoms.

*__Tomato yellow leaf curl virus,__ *Begomovirus (GEM2),* spread primarily by silverleaf whiteflies, this virus causes stunting and can severely affect yields.

*__Thousand cankers disease complex,__ *Geosmithia species,* an aggressive fungus spread by a native beetle; can kill a walnut tree in three years or less.

**Currently found in California (June 2010).*

# CALIFORNIA INVASIVE SPECIES ADVISORY COMMITTEE

**CISAC Chair Doug Johnson,** Executive Director, California Invasive Plant Council

**CISAC Vice-Chair Andrea Fox,** Legislative Policy Analyst, Governmental Affairs, California Farm Bureau Federation

**Linda Arcularius,** Supervisor, Inyo Board of Supervisors

**Ted Batkin,** President, California Citrus Research Board

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**Rick Tomlinson,** Technical Committee, California Strawberry Commission

**Keith Douglass Warner,** Lecturer, Religious Studies Department, Asst. Director for Education at the Center for Science, Technology & Society, Santa Clara University

For more information on the Invasive Species Council of California and its advisory committee, and a more comprehensive list of invasive species posing threats to the state's agriculture, environment and habitat, please visit **www.iscc.ca.gov.**

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