Description
*A. nobilis* are deep-bodied, laterally compressed fish with big heads, hence the name bighead carp. FIGIS (2005) states that the length of the head is larger than body height and the mouth slants upwards and the lower jaw extends slightly over upper jaw. Their scales are very small. There are approximately 85-100 scales in the lateral line, and 26-28 scale rows above the lateral line. The fins of small specimens lack spines. Large specimens have a heavy, stiff, non-serrate spine at the origin of the dorsal fin and a slightly stiffened spine at the anal fin origin. The dorsal fin has eight (rarely nine) soft rays, the anal fin has thirteen (rarely fourteen) soft rays. The gill rakers are long, comb like and close-set, not fused into a porous plate. The pharyngeal teeth count is 4-4 (The Gulf States Marine Fisheries Commission, 2003).

Habitat description
FIGIS (2005) states that, "*A. nobilis* is a eurythermic fish (an animal that can tolerate a wide range of temperatures), being able to tolerate water temperatures of 0.5-38°C. It inhabits lakes, rivers and reservoirs. This species normally dwell in the upper layer of the water column and prefers high fertility water with abundant natural food. "Stone *et al.* (2000) report that, "*A. nobilis* are native to large rivers and will not spawn in still waters or small streams. Although fish do mature in ponds and can be induced to spawn with hormone injections, they do not spawn naturally in still water."

Ecological Threat
USGS-NAS (2005) reports that, "Because bighead carp are planktivorous and attain a large size, Laird and Page (1996) suggested these carp have the potential to deplete zooplankton populations. A decline in the availability of plankton can lead to reductions in populations of native species that rely on plankton for food, including all larval fishes, some adult fishes, and native mussels." *A. nobilis* is also a carrier of several different fish diseases that can be spread through its escape and introduction (FIGIS, 2005).

Geographical range
Native range: China and Russia (Nguyen and Nakorn, 2004; and Elvira, 2001).
Known introduced range: Africa, Asia, Australasia-Pacific, North America, and South America (FishBase, 2005; Elvira, 2001; USGS-NAS, 2005; and Stone *et al.* 2000).
The giant African land snail (Achatina fulica) has spread widely from its native Africa to invade many tropical and subtropical regions including islands in the Indian Ocean, West Indies and Pacific Ocean. It is highly adaptable to a wide range of conditions and finds a wide range of foods and habitats acceptable. It can aestivate (similar to hibernating) in extreme conditions to avoid de-hydration. This makes it an ideal invasive species, allowing to survive long ship journeys unscathed. In addition it the female is able to store sperm, allowing it to found a population from a single individual.

**Description**

*A. fulica* has a narrow, conical shell, which is twice as long as it is wide and contains 7 to 9 whorls when fully grown. The shell is generally reddish-brown in colour with weak yellowish vertical markings but colouration varies with environmental conditions and diet. A light coffee colours is common. Adults of the species may exceed 20cm in shell length but generally average about 5 to 10cm. The average weight of the snail is approximately 32 grams (Cooling 2005).

**Occurs in:**

*agricultural areas, coastland, disturbed areas, natural forests, planted forests, riparian zones, scrub/shrublands, urban areas, wetlands*

**Habitat description**

*A. fulica* is most closely associated with tropical and subtropical moist broad-leaf forests and tropical and subtropical dry broadleaf forests (Venette and Larson 2004, in Cooling 2005). However, there are a wider range of landcover types that are suitable for the snail, including residential. The snail is terrestrial and is commonly found in and around human dwellings, gardens and woodlands. The snails generally hide during the day under leaf litter or in and around compost heaps and shrubs or in crevices in rocks and tree roots (Cooling 2005).

In order for eggs to hatch a minimum temperature of 15 degrees is required for up to 21 days (Biosecurity New Zealand 2005, in Cooling 2005). Mead (1961) states that at temperatures of 6 to 7 degrees snails persist but do not thrive, however, there have been exceptions of snails doing well at lower temperatures (Srivastava 1992, in Cooling 2005).

**Management information**

Localised eradication on some islands of Hawai‘i appears to have been successful (Mead 1979, in Cooling 2005). Small populations of *A. fulica* have been eradicated from Fiji, Western Samoa, Vanuatu and Wake Island (Raut and Barker 2002, in Cooling 2005). As *A. fulica* has a tendency to undergo a population explosion following establishment eradication measures should be undertaken immediately following detection. It is important that diet switching and changes in nutrient availability be taken into account in eradication attempts (Srivastava 1992, in Cooling 2005).

Likely pathways and high risk sites should be identified for greater scrutiny (Animal and Plant Health Inspection Services 2005, in Cooling 2005). Ongoing surveillance and monitoring is important to detect signs of recurrence and should be undertaken for 2 to 3 years following eradication.

**This species has been nominated as among 100 of the "World's Worst" invaders**
This small, dark purple female lays eggs on the tree. Its feeding tube is permanently fixed in the tree's bark.

If symptoms of the balsam woolly adelgid are observed, check the tree's trunk and trunk-branch union for white, woolly spots. These spots are the waxy coverings of adult adelgids. They can be seen on the tree year-round.

**Description**

Adults are blackish purple, roughly spherical in shape, less than 1/32 inch (1 mm) long, almost invisible to the naked eye, and covered with secretions of waxy threads that appear as a dense, white, wool mass. Eggs are orange in color. The first immature motile stage of *A. piceae*, known as a "crawler", is also orange with legs and black eyes. The following instars are sessile and resemble the adult. In North America, *A. piceae* is parthenogenetic. Eggs and crawlers can be identified with the aid of a hand lens.

**Habitat description**

*Adelges piceae* can be found in natural stands of all kinds of fir, especially Fraser and Balsam firs. Distribution is limited at higher altitudes and latitudes by cold weather as mortality occurs above the snowline or where temperatures fall below 30 degrees F.

**General impacts**

*A. piceae* feeds on all true firs with long, tube-like mouthparts, and they also secrete an irritating, salivary substance that elicits a defensive response from trees where the adelgid is not native. Balsam fir is the main host of *A. piceae*, where it attacks both stems and shoots. The principal injury associated with stem infestations seems to be obstruction of the water-conducting tissue. But some decline is probably related to obstruction in the phloem tissue, which has an important role in transporting and storing food. Stem attack results in the formation of dense compression wood, reducing the quality of the wood fiber that is used in pulp and paper manufacturing. Prolonged shoot attack will hinder bud growth and height growth. Tree vigor declines as photosynthetic function decreases and foliage is lost. No new needles replace those that are naturally shed. This ultimately leads to top kill and mortality of the whole tree. Infested Balsam and Fraser firs may be killed in only 3 to 4 years. North American hosts are so sensitive to attack that the damage seems out of proportion to the insect's size and method of feeding. Billions of feet of fir timber have been destroyed by *A. piceae* in North America. It is a serious pest to seed production, landscape and natural fir, and fir Christmas tree industry. Attempts to control the insect have been unsuccessful, and the U. S. Fish and Wildlife Service listed the Fraser fir as a species of special concern.

**Geographical Range**

Native range: Central Europe,

Known introduced range: *A. piceae* is now distributed throughout eastern and western North America, Canadian maritime provinces, and the Gaspe region of Quebec.
The ctenophore *Mnemiopsis leidyi* is a major carnivorous predator of edible zooplankton (including meroplankton), pelagic fish eggs and larvae and is associated with fishery crashes. Commonly called the comb jelly or sea walnut, it is indigenous to temperate to subtropical estuaries along the Atlantic coast of North and South America. In the early 1980s, it was accidentally introduced via the ballast water of ships to the Black Sea where it had a catastrophic effect on the entire ecosystem. In the last two decades of the twentieth century, it has invaded the Azov, Marmara, Aegean Seas and recently it was introduced into the Caspian Sea via the ballast water of oil tankers.

**Description**

*Mnemiopsis leidyi* is a comb jelly with a length up to 100 mm. The body is laterally compressed, with large lobes arising near the stomodeum, generating 4 deep, noticeable furrows that characterize the genus. It has four rows of small, but numerous, ciliated combs which are iridescent by day and may glow green by night (NIMPIS, 2002). The color is usually transparent or slightly milky, translucent (Shiganova 2003).

**Habitat description**

The native habitat of the ctenophore, *Mnemiopsis*, is in temperate to subtropical estuaries along the Atlantic coast of North and South America (Mayer, 1912). *M. leidyi* is tolerant of a wide range of salinity, temperature and water quality conditions over a broad range of inshore habitats. Since its unintentional introduction to the Black Sea, *Mnemiopsis* has spread to adjacent bodies of water, inhabiting waters of salinities ranging from 3% in the Sea of Azov to 39‰ in the eastern Mediterranean, and temperatures ranging from 4°C in winter to 31°C in summer (Dumont and Shiganova).

**Geographical range**

Native range: The native habitat of the ctenophore, *Mnemiopsis*, is in temperate to subtropical estuaries along the Atlantic coast of North and South America between 40 degrees north to 46 degrees south (Mayer, 1912, Costello, 2001). Known introduced range: The unintentional introduction of *M. leidyi* to the Black Sea in the early 1980s allowed it to secondarily expand its range to the adjacent seas of Azov, Marmara, the Aegean and perhaps the eastern Mediterranean (Studenikina et al, 1991, Shiganova et al, 2001). However, nowhere were conditions as optimal and perennial as in the Black Sea and the surface waters of the Sea of Marmara. It has to re-invade the Sea of Azov each year. Low numbers take advantage of the Black Sea current to reach the northern Aegean Sea where they disperse, according to the dominant circulation patterns. However, its presence in Saronikos Gulf and Elefsis Bay could be also due to ballast water release as elsewhere in the eastern Mediterranean Sea (Shiganova et al., 2001).

This species has been nominated as among 100 of the "World's Worst" invaders.
Akebia quinata, also known as chocolate vine, is a twining woody vine that grows quickly and, if left unmanaged, can cover, outcompete and kill existing ground level herbs and seedlings, understory shrubs and young trees. Once established, its dense growth prevents seed germination and establishment of seedlings of native plants.

Habitat description
A. quinata tolerates shade and drought, and it can invade many types of habitats. It prefers light (sandy), medium (loamy), and heavy (clay) soils but requires a well-drained yet moist soil. A. quinata can succeed in either acid or alkaline conditions. Although it prefers partial shade and does well on northerly aspects, it can also succeed in full sun. The dormant plant is hardy to about -20°C, however, young growth in spring is frost-tender even on mature plants. It is semi-evergreen in milder winters.

Description
A. quinata grows as either a twining vine or vigorous groundcover and has slender, rounded stems that are green when young and brown at maturity. The palmate (like a hand) leaves of A. quinata alternate along the stem and are divided into five, or sometimes fewer, approximately equal parts called leaflets, the small stems of which meet at a central juncture. Leaflets are generally long, oval in shape, 1½ to 3 inches long, with a purplish tinge that becomes blue-green at maturity. Flowers are chocolate-purple colored, fragrant, and about 1 inch across. Fruits are purple-violet, flattened sausage-like pods, 2 1/4 to 4 inches in length. The inside of the pod has a whitish, pulpy core with many tiny black seeds. A. quinata is deciduous in cooler climates but may remain evergreen in warmer regions. Flowers and fruits are uncommon.

General impacts
A. quinata This vine is invasive and ecologically dangerous because it tends to naturalize easily in favorable climates. Once established, it poses a serious threat to native flora, out-growing and displacing native plants and usurping light, water, nutrients, and space.

Geographical range
Native range: A. quinata is native to a region extending from Central China to Korea and Japan.
Known introduced range: It occurs in at least 19 states in the eastern United States, from Massachusetts to Georgia, and west to Lousiana, Missouri and Michigan. It has also invaded southwest England.