YUSO 2017 Invasive Species Answer Key

Part 1 – Identification (125 pts)

1.
    a. Whitenose Bat Syndrome, Pseudogymnoascus destructans
    b. Muzzle, ears, wings
    c. 90%-100%
    d. Bats are valuable members of ecosystems around the world, saving farmers in the U.S. alone over $3 billion annually in pest control services. One colony of bats can consume many tons of insects that would otherwise consume valuable crops. Many species of bats are also valuable for the pollination of plants and dispersal of plant seeds.
    e. Incorporate one or more snags (standing, dead trees) into the landscape, keeping old and damaged trees when possible
2.
    a. Mile-A-Minute Weed, Persicaria perfoliata
    b. small elaiosome; short-distance seed dispersal by ants
    c. Timandra griseata
    d. a nursery site in York County, Pennsylvania
    e. sharp downward-curved prickles or spines that grow on the vine's stem and petioles
3.
    a. Pink Hibiscus Mealybug, Maconellicoccus hirsutus
    b. 1984, Hawaii
    c. deposit up to 600 eggs and produce up to 15 generations per year
    d. Cryptolaemus
    e. (only need 2) lateral wax filaments, shape and size, presence/absence of an ovisac, color of eggs, and body color
4.
    a. Kudzu, Pueraria montana var. lobata
    b. Faboideae
    c. soil is persistently soggy for five to seven days, with temperatures above 20 °C (68 °F)
    d. any cow, horse, sheep, or goat (e.g. brown cow)
    e. spreads through runners (stems that root at the tip when in contact with moist soil), rhizomes and by vines that root at the nodes to form new plants (NOT by seeds)
5.
    a. Zebra Mussel, Dreissena polymorpha
    b. By using tiny fibers called byssal threads
    c. Clogs up water intakes
    d. Zequanox® and copper products, such as copper sulfate
    e. By filter-feeding particles in the water

6.
   a. Japanese Honeysuckle, Lonicera japonica
   b. By examining the upper leaves and berries
   c. underground rhizomes and aboveground runners
   d. There are none!
   e. September through November

7.
   a. Tropical Soda Apple, Solanum viarum
   b. If the seed is white
   c. 3-6 feet
   d. pastures, ditch banks, citrus groves, sugarcane fields, and wet areas of rangeland
   e. SolviNix™, which contains a naturally occurring virus called Tobacco mild green mosaic tobamovirus (TMGMV)

8.
   a. Hydrilla, Hydrilla verticillata
   b. Shores of Korea
   c. spread into shallow water areas and form thick mats that block sunlight to native plants below, effectively displacing the native vegetation of a waterbody
   d. the presence of small (up to half inch long), dull-white to yellowish, potato-like tubers which grow 2 to 12 inches below the surface of the sediment at the ends of underground stems
   e. prevention of new infestations

9.
   a. Spotted Knapweed, Centaurea stoebe
   b. contamination in a shipment that used alfafa/clover seed/soil as ship ballast
   c. (only need 2) Alternate, grayish, hoary, and divided into lance-shaped lobes decreasing in size at the top
   d. roots exude (-)-catechin to inhibit competition by a wide range of other plant species; inhibits seed germination and growth in making phosphorus more available in certain soils, leading to cell death of competing plants by acidification of the cytoplasm
   e. moths, weevils, fruit flies

10.
   a. Purple Loosestrife, Lythrum salicaria
   b. Florida (only)
   c. by water and in mud adhered to aquatic wildlife, livestock and people
   d. astringent medicinal herb to treat diarrhea and dysentery
   e. By extracting the large amounts of nectar in the flower due to honeybee pollination

11.
   a. Oak Wilt, Ceratocystis fagacearum
   b. Within several months
   c. Transmission via root graft. Oak wilt usually moves from diseased trees to healthy trees through roots that have become interconnected (root grafts)
   d. Red oaks

e. Fungal mats will also produce sexual spores called ascospores with a fruity smell that attract beetles

12.
a. Japanese Knotweed, Fallopia japonica
b. hollow stems with distinct raised nodes
c. Rhizomes extend 7 metres (23 ft) horizontally and 3 metres (9.8 ft) deep, rooting itself firmly into the soil; resilient to cutting, vigorously resprouting from the roots
d. Eaten as a wild, foraged vegetable
e. leaf spot fungus from genus Mycosphaerella

13.
a. Medusahead, Taeniatherum caput-medusae
b. Poales
c. 1880s near Roseburg, Oregon
d. Barbs on the awn twist and spread in all directions into the soil, locking the seed into place
e. Revegetation with desirable species

14.
a. Hemlock Woolly Adelgid, Adelges tsugae
b. phloem sap of tender hemlock shoots
c. 3 to 6 years
d. Mid to late Spring
e. Biological control

15.
a. Canada Thistle, Cirsium arvense
b. 150 cm
c. feathery pappus which assists in wind dispersal
d. fruit flies, Orellia ruficauda
e. taproot

16.
a. Garlic Mustard, Alliaria petiolata
b. 2-4 feet tall
c. allelochemicals (allyl isothiocyanate and isothiocyanate) to suppress mycorrhizal fungi that native trees need for growth
d. Five years
e. Mechanical hand pulling in early spring → before seeds are set

17.
a. Asian Carp
b. Leap out of water when startled by engine noises
c. Up to 100 pounds
d. Great Lakes System, particularly Lake Michigan
e. Imported from China in the 1970s to clean ponds, fishing

18.
a. Emerald Ash Borer, Agrilus planipennis
b. New Haven, CT
c. Colorado (2013)
d. Firewood

e. Quarantine of ash lumber/firewood transport in infected states/counties, fines for transport of wood, preemptively cutting down elm trees to prevent spread

19.
a. Curly or Curlyleaf Pondweed, Potamogeton crispus
b. Life cycle: first pondweed to emerge in spring, dies by mid-summer
c. Plant fragments attached to boat trailers
d. Out-competing native species, die-off in mid summer decreases dissolved oxygen which limits summer growth of native plants, decaying mats increase phosphorus and create algal blooms, surface mats reduce aquatic recreation
e. Low light, cold water temperatures

20.
a. Spiny water flea, Bythotrephes longimanus
b. Northern Europe
c. clear water, low zooplankton counts
d. Daphnia
e. Eggs can survive being dried out/out of water

21.
a. Asian Long-Horned Beetle, Anoplophora glabripennis
b. Maple
c. 1996, New York (Brooklyn)
d. Weaken the tree, interrupt sap flow, branches more easily broken off
e. Maple Syrup Industry, lumber industry

22.
a. European Gypsy Moth, Lymantria dispar
b. Apple, cherry, hawthorn, hickory, maple, oak, sassafras, sweetgum, willow
c. Larvae make silk nets that catch the wind; long distance transport on firewood + outdoor equipment
d. Gypsy moth larvae do not form webs
e. Crush eggs, soak in kerosene/soapy water, burn the egg mass
NB: dropping on the ground/just removing from the tree DOES NOT KILL

23.
a. Rusty crayfish, Orconectes rusticus
b. Ohio River basin
c. bait, fishing vessels
d. outcompete native crayfish, eat native fish eggs, cut down aquatic vegetation
e. prevention (avoid introduction, public education and outreach about introduction), reintroduction of bass populations to feed on crayfish

24.
a. Eurasian Watermilfoil, Myriophyllum spicatum
b. Usually 3 to 10 feet, up to 33 feet
c. Can reproduce from single stem/leaf fragments
d. Lakes w/healthy established native plant populations limit ability to establish
e. Eurasian watermilfoil weevil, Euhrychiopsis lecontei

25.
a. Asian Swamp Eel/Rice Eel, Monopterus albus
b. *Synbranchidae* → it's NOT an eel but a FISH
c. Florida, Georgia, Hawaii as of 2006

d. Large range of prey, competition displaces native species, no known predators in North America
e. All young are female

Part 2 – Short Answer (44 pts)

1.

a. Invasive Species: an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health
b. Exotic Species: a species living outside its native distribution range which has arrived there by human activity either deliberate or accidental
c. Unintentional introduction: introduction of an exotic or non-native species into an ecosystem outside its own native range by human vectors
d. Cultural control: manipulation of the habitat environment to increase pest mortality, decrease rates of pest increase/damage
e. 10% rule: only 10% of introduced exotics live at all due to wrong climate, food availability, etc. Of 10% that live, 10% of that will breed and become invasive

2. Few predators, outcompete native species for food/habitat, adaptable, reproduce quickly, thrive in disturbed systems

3. Accidental release: Ballast water (green crab, zebra mussel, spiny waterflea), lumber, food/material contamination, human transportation hitchhikers

Intentional release: European starling (culture), ornamental decoration (honeysuckle, purple loosestrife), lab animal/pet/plant/bait release into the wild,

➔ For these, have the list handy and be prepared to look up how a species was introduced if not known already, since any species on the list is fair game

4.

Type of control	Plus	Minus
Prevention	No introduction of new species, no chemical runoff, public involvement, easier/more effective than remediation	Lack of public awareness/lack of public "caring," funding for public campaigns
Eradication	If done soon after invasion is effective, doesn't damage other native species	Difficult, time/labor/cost intensive, can damage the ecosystem if done widespread/non targeted
Physical (manual/mechanical)	No chemical or biological introduction, can target specific individuals and leave native species undamaged, can engage the public	Time/labor/cost intensive, if any individuals are missed the population can regrow, requires repeated removals for multiple consecutive years to be effective

Biological	Using natural predators to target the species, leaves native populations unchecked	Can introduce another invasive species if not done properly, disrupt the ecosystem
Chemical	Pesticides that target the invasive species but leave native species healthy, no need to target specific (can spray widely)	Dangerous to use in aquatic ecosystems, can kill native species, risk of chemical resistance developing
Integrated Pest Management	Combining multiple methods has proven to be the most effective way of controlling species once introduced	Very cost intensive, difficult to come up with a multipronged approach to invasives, requires many different parties cooperating to remove a species