ISLIP INVITATIONAL 2016
INVASIVE SPECIES
STATION #1

INVASIVE SPECIES #1

INVASIVE SPECIES #2

[A] [B] [C] [D]
1. European Gypsy Moth
2. European Pepper Moth
3. Male – Elongated Abdomen OR wavy lines on hindwings
4. Pupa
5. 1860s. Trouvelot imported moths in an attempt to interbreed with silkworms – escaped from laboratory.
6. NPV (nucleopolyhedrosis virus)
STATION #2

INVASIVE SPECIES #3

INVASIVE SPECIES #4
1. **Pueraria montana** var. lobate
2. **Persicaria perfoliata**
3. Asia
4. Vegetative spreading via stolons (surface runners) that root at the nodes
5. Remove root crowns; continual mowing; manual defoliation (strip off new vines to starve roots); use plastic sheeting to cover kudzu to overheat; use grazing animals; mechanical defoliation (use a weedwacker to strip off vines to starve roots); cover plants with heavy mulch; rock rake to tear up roots in open fields
6. **Rhinoncomimus latipes**. The larvae bore into the stem of the plant, causing loss of apical dominance and stunted plant growth. The weevils can also cause plant mortality in the presence of competing native vegetation. The weevils can adversely affect seed production causing a decrease in reproductive ability.
STATION #3

INVASIVE SPECIES #5

INVASIVE SPECIES #6
**STATION #3**

1. Provide the full scientific name for **INVASIVE SPECIES #5**. [1]
2. Provide the full scientific name for **INVASIVE SPECIES #6**. [1]
3. Provide the continent to which **INVASIVE SPECIES #5** is indigenous and a possible mechanism for its introduction to Long Island waterways. [2]
4. Identify the stage of development shown for **INVASIVE SPECIES #6** in the top image to the right. [1]
5. Identify the stage of development shown for **INVASIVE SPECIES #6** in the bottom image to the right. [1]
6. Based on the known eating habitats and habitat preferences of **INVASIVE SPECIES #5**, explain how the organism is primed to cause significant damage to the Eastern US coastal ecosystems. [2]

1. *Hemigrapsus sanguineus*
2. *Carcinus maenas*
3. Asia; the larvae were probably present in ship ballast water
4. Metalopa
5. Zoea
6. It is an opportunistic omnivore that is able to tolerate significant differences in water salinity and temperatures. It lives in rocky, hard-bottom intertidal regions, which are similar habitats to the native mud crabs and even the European green crab. The crab is also known to eat commercially important species, namely juvenile shellfish, which may threaten cultivation of these species.
1. Provide the common name for INVASIVE SPECIES #7. [1]
2. Provide the common name for INVASIVE SPECIES #8. [1]
3. Provide the common name for INVASIVE SPECIES #9. [1]
4. California has shown moderate success with one biological control agent against INVASIVE SPECIES #7. Identify this organism. [1]
5. Explain two methods where more than 25% surface water coverage can result in fish kills from INVASIVE SPECIES #9. [2]
6. Besides the cost for removal, identify two additional economic impacts associated with INVASIVE SPECIES #8. [2]

1. Brazilian Waterweed
2. Hydrilla
3. Curly Leaved Pondweed
4. The large amount of vegetation consumes a lot of oxygen at night after sunset leading to the suffocation of pond life. In the summer months when the leaves fall off, the decomposition of the debris consumes a lot of oxygen to the same effect.
5. Sterile Green Carp
6. Clog/damage dams, power plants; Effect on fish populations can affect fishermen; Damage to boating equipment; Decrease in tourism for lake communities (no fishing or swimming)
STATION #5

INVASIVE SPECIES #10

INVASIVE SPECIES #11

INVASIVE SPECIES #12

INVASIVE SPECIES #13
STATION #5

1. Provide the full scientific name for INVASIVE SPECIES #10. [1]
2. Provide the full scientific name for INVASIVE SPECIES #11. [1]
3. Provide the full scientific name for INVASIVE SPECIES #12. [1]
4. Provide the full scientific name for INVASIVE SPECIES #13. [1]
5. All four invasive species at this station belong to which phylum? [1]
6. A radula is a common feature on which of the invasive species at this station? Include all possible species (by #) for credit. [1]

1. Corbicula fluminea
2. Dreissena polymporpha
3. Dreissena rostriformis bugensis
4. Potamopyrgus antipodarum
5. Mollusca
6. #13 (New Zealand Mud Snail)
7. N and D
8. O
1. *Corbicula fluminea*
2. *Dreissena polymorpha*
3. *Dreissena rostriformis bugensis*
4. *Potamopyrgus antipodarum*
5. *Mollusca*
6. #13 (New Zealand Mud Snail)
7. N and D
8. O

**STATION #5**

The internal anatomy of **INVASIVE SPECIES #11** is shown below. Use the letters on the diagram to answer the following questions. Some questions may require more than one letter to correctly answer the prompt.

7. The structure(s) responsible for opening and closing the shell. [1]
8. The structure(s) responsible for reproduction. [1]
STATION #6

INVASIVE SPECIES #14

INVASIVE SPECIES #15
1. Southern Pine Beetle
2. Emerald Ash Borer
3. Establishment of quarantine zones and maps limiting the movement of ash from known areas of infestation. Establishment of inspection requirements and permits for shipments within and outside of quarantine areas.
4. Woodpeckers have increased food in larvae from both. OR Killing of trees (either through infection or through selective killing) can serve as foraging sites or potential nesting cavity sites.
5. B
6. C
7. D
STATION #6

The question prompts below refer to the images to the right. Use the letter in each image to answer the following questions.

5. Is an invasive species that is targeting upstate New York alfalfa on farmlands. [1]

6. While feeding on the tree, this invasive species eats beneficial fungi in the wood while also introducing a blue stain fungi that penetrates the wood and exasperates tree death. [1]

7. The adults of this invasive species leave distinctive D-shaped exit holes in the infested trees. [1]
STATION #7

INVASIVE SPECIES #16

INVASIVE SPECIES #17

A

B

(1)
(2)
(3)
1. Spiny Water Flea
2. Fishhook Water Flea
3. Male; (1); Penis
4. Europe OR Asia
5. The water fleas may compete with juvenile fish for zooplankton.
6. The sharp spines make it difficult for smaller fish to eat them, leaving the possibility for only larger fish as potential predators.
STATION #8

INVASIVE SPECIES #18

INVASIVE SPECIES #19

INVASIVE SPECIES #20

INVASIVE SPECIES #21
1. *Euphorbia esula*
2. *Iris Pseudacorus*
3. *Lysimachia vulgaris*
4. *Berberis thunbergii*
5. It cannot be used since the plants are toxic to most native and domesticated grazing animals.
6. The leaf litter will increase the pH of the soil.
7. I
8. A
1. *Euphorbia esula*
2. *Iris Pseudacorus*
3. *Lysimachia vulgaris*
4. *Berberis thunbergii*
5. It cannot be used since the plants are toxic to most native and domesticated grazing animals.
6. The leaf litter will increase the pH of the soil.
7. I
8. A
STATION #9

INVASIVE SPECIES #22

INVASIVE SPECIES #23

INVASIVE SPECIES #24
1. Elaeagnus umbellata
2. Viburnum sieboldii
3. Euonymus alatus
4. Frankia bacteria. The bacteria are nitrogen-fixing bacteria, so the plant is able to grow in nutrient-depleted soils.
5. Birds eat berries and carry seeds over larger areas.
6. The student should be careful with glyphosate-based herbicides as it is a non-selective herbicide. Any other native plant that comes in contact with the chemical will be killed.
1. Alewife
2. Northern Snakehead
3. Ruffe
4. It is a top predator, so the introduction of the fish could have catastrophic consequences on all other fish and other animal species in the environment.
5. The organism cannot be imported or transported between states. This includes eggs and offspring.
6. B
7. A
8. D
1. Alewife
2. Northern Snakehead
3. Ruffe
4. It is a top predator, so the introduction of the fish could have catastrophic consequences on all other fish and other animal species in the environment.
5. The organism cannot be imported or transported between states. This includes eggs and offspring.

**STATION #10**

The external anatomy of INVASIVE SPECIES #25 is labeled in the diagram below. Use the letters from the diagram to identify the following anatomical structures.

7. Operculum [1]
8. Caudal Fin [1]
STATION #11

INVASIVE SPECIES #28

INVASIVE SPECIES #29

INVASIVE SPECIES #30
STATION #11

You have been provided five different plants or ecosystems that have been damaged by five different invasive species. In the following questions, identify the common name of the organism responsible for the damage in each image and match the organism to the damage (INVASIVE SPECIES #28 to #30) for the three organisms that are shown in the images. For the two organisms not shown, place a line through the invasive species number space on the answer sheet. [8 total points]

1. Damage A
2. Damage B
3. Damage C
4. Damage D
5. Damage E

1. Spotted Winged Drosphilia (#29)
2. Virburnum Leaf Beetle
3. Didymo/Rock Snot (#28)
4. Golden Nematode (#30)
5. Swede Midge
STATION #12

INVASIVE SPECIES #31

INVASIVE SPECIES #32

INVASIVE SPECIES #33
1. Brown Marmorated Stink Bug
2. Sirex Woodwasp
3. Hemlock Wooly Adelgid
4. A,D
5. Grapes, Apples, Hazelnuts, Peaches, Pears, Catalpa, Paulownia, Tree of Heaven, Blueberries, Blackberries, Raspberries, Eggplants, Lima Beans, Okra, Peppers, Snap Beans, Sweet Corn, Tomatoes, Cotton, Soybeans
6. The nematode sterilizes the female by infecting the larvae only capable of laying nematode-infested infertile eggs.
7. Summer
STATION #13

INVASIVE SPECIES #34

INVASIVE SPECIES #35

INVASIVE SPECIES #36

INVASIVE SPECIES #37
STATION #13

MAP #1: ORIGINS IN SOUTHERN EUROPE, ASIA, & EGYPT

MAP #2: ORIGINS IN EASTERN ASIA

MAP #3: ORIGINS IN PANTROPICAL SOUTHEAST ASIA

MAP #4: INVASIVE HAPLOTYPE HAS ORIGINS IN EUROPE
STATION #13

The maps are from Discover Life, an organization that specializes in identifying species and representing biodiversity around the world. The maps are potentially helpful in determining the extent that invasive species has spread; the geographic location of where the species is found is plotted on these maps. For each invasive species, provide its **full scientific name** and match the provided map based on the extent of infestation and also the region of the original native populations.

1. **INVASIVE SPECIES #34. [2]**
2. **INVASIVE SPECIES #35. [2]**
3. **INVASIVE SPECIES #36. [2]**
4. **INVASIVE SPECIES #37. [2]**

1. Phalaris arundinacea (Map 1)
2. Phragmites australis (Map 4)
3. Miscanthus sinensis (Map 2)
4. Imperata cylindrical (Map 3)