

# VEGETABLE RESEARCH PROJECTS

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## **Insect Pests of Water Spinach**

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Water spinach (*Ipomoea aquatica*) is an Asian green closely related to sweet potato (*Ipomoea batatas*). It is of great interest to farmers who are growing for Asian markets in Massachusetts. We are currently working to identify key pests of this crop in Massachusetts, to understand their biology and how to manage them. Farmers in the New Entry Sustainable Farming Project, a collaborative project with Tufts University, are working with us to develop effective management options that can be used by small farmers.

Water spinach provides a habitat for the broad-ranging tarnish plant bugs. Their feeding often occurs at the base of the leaves. When the plants are young, the whole stem will wilt and die.



On older plants feeding results in large brown welts, often at the point where the stem meets the leaf. Feeding at the apical meristem of the plant, on the youngest shoots and leaves causes new growth to come out deformed and riddled with unevenly shaped holes.



Because the tarnish plant bug oviposits its eggs inside the stems of plants the large brown gashes often found on main stalk are likely the exit holes of the hatching nymphs.

The most fascinating pest of water spinach is the tortoise beetle. The larvae are soft-bodied, slow moving, and uniquely camouflaged. A parasol of shed skins and fecal matter, attached at their rear, rides on top of their back. It acts as a deterrent to predators and protection, since underneath it they are relatively defenseless. The golden tortoise beetles have brown larva, while the bodies of the mottled tortoise beetles are yellow-green. These ugly little larva feed all over the plant, but mostly on the upper surfaces of the leaves. Their holes are large and numerous, usually with even, rounded edges, unlike tarnish plant bug feeding. They are also common pests of sweet potato. Some species will feed on potatoes and tomatoes as well. They also feed on a broad range of weeds, their favorite being bindweed, but also thistles and horse nettles. For this reason, many fields already have a population present before a sweet potato or water spinach crop is even introduced. When the larva reach full size they attach themselves to the plant, sometimes in a protected area



around the base. Their bodies harden but outwardly remain about the same until they crawl out of their larval shell about 14 days later. The adults of the golden tortoise beetle (*Metriona bicolor*) resemble a lady beetle in color and size. There are only two spots,



however, one on each wing and with closer observation it becomes apparent that the shape of the shell is much different, more saucer-like. This reddish orange, innocuous looking beetle, will change to a brilliant bronzy golden when it is “in love”, or in other words, ready to mate. Disturb it or try to pick it up and it will immediately start to fade back to red-orange. The other common species on water spinach is the mottled tortoise beetle (*Deoyala guttata*). The shell is a spotted gold and black and never undergoes any changes in color. The adult tortoise beetles lay their eggs on the undersides of leaves in groups of 20-30. The eggs are white and about 1mm in length.

Of these three pests, tortoise beetles seem to cause the most damage. Our current research centers around tortoise beetle rearing in the lab to learn more about their ecology and spray trials with various insecticides in the field. We will be testing two insecticides that are labeled for leafy greens, spinosad (SpinTor) and neem (Aza-Direct).

**Regulatory issues:** *Ipomoea Aquatica* is listed as a federal noxious weed through the United States Department of Agriculture (USDA). USDA’s Animal and Plant Health Inspection Service (APHIS) oversees the Federal noxious weed program in order to prevent the introduction of exotic invasive plants and/or to prevent the spread of introduced invasive plants. The federal noxious weed program gives APHIS regulatory control over the interstate movement of all plants on the noxious weed list. Any person or company who moves a noxious weed across state borders without the appropriate permits is breaking the law and is subject to fines through APHIS.

Because of the interest among Asian growers and consumers in this crop in Massachusetts, and because its sensitivity to frost makes it extremely unlikely for the plant to produce seed or survive the winter in this climate, the APHIS PPQ offices in Massachusetts have agreed to allow water spinach to be introduced in the state. It may only be grown from seed from a registered source and only sold within the state. Growers who wish to know more about steps they need to take in order to grow this crop should contact Frank Mangan (978-422-6374).