Identifying Weed Management Priorities from the Ground Up: 2019 New England Vegetable & Fruit Conference Survey Results

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Weed management begins with understanding what species are present as well as their life cycle. Confidence in weed identification is the first, critical step to successfully protecting crops form damage weeds do. Weeds can cause many different problems in a cropping system, making this diverse group of pests especially important to manage. Weeds act as alternate host plants to insect pests such as dock sawfly, stink bugs (Figure 1), borers, tarnished plant bug, aphids. Invasive insect pests like brown marmorated stink bug, spotted sing drosophila, and spotted lanternfly, often use weed hosts to feed their populations throughout the growing season only to jump the weed ship and feast on your crops when wild host carbohydrate stores are depleted. This usually occurs just in time for harvest, causing damage that, sometimes, may not manifest until your crops reach the consumer's table.

Sooty blotch and fly speck, rusts and other pathogens use weeds as either a waypoint between crop hosts, or, they may rely on these weedy hosts to complete a portion of their life cycle. Either way, pathogens can hop from weeds to your crops. Voles, rabbits and porcupines will all take shelter in the safety and bounty of a weedy patch. Once they have eaten what they like out of the weeds, fruit trees are often next on the menu. Weeds have evolved over time to be highly competitive organisms. Their seeds emerge sooner than most crops, they are more tolerant of adverse conditions and are quicker to snatch up valuable resources. If you are applying fertilizer to your crops while weeds are present and actively growing, you are in essence fertilizing your weed crop. The weeds will thank you for this service by setting seed and sending out new root shoots in order to provide you with even more weeds to enjoy. In addition to competition for resources, some weeds can harm crops by way of chemicals they release from

Figure 1. Left, pokeweed grown into apple tree, hosts native stink bug nymph. Bottom center, native stink bug nymph close up. Top center, native green stink bug adult. Right native green stink bug adult on pokeweed in apple.

Figure 3. *Tragopogon dubius,* commonly known as yellow salsify.

Figure 2. *Chenopodium album,* commonly known as lamb's quarters.

their roots. Black walnut, for example can kill apple trees if the two root systems are in close proximity to one another.

The damage weeds cause is almost as diverse as weed species populations. This makes proper identification of weeds present in crops all the more important. In order to determine how best to implement weed management Extension educational programming, a survey "pop quiz" was given to a group of growers who attended the 2019 New England Vegetable and Fruit Conference (NEVFC) in Manchester, NH. The purpose of this survey was to determine the level of grower's knowledge on weed species identification.

Figure 4. *Rumex obtusifolius,* commonly known as broadleaf dock.

Figure 5. *Cyperus esculentus,* commonly known as yellow nutsedge.

Materials & Methods

An instant-response survey was implemented at the weed management session (on 11 December 2019) of the NEVFC. This session was attended by approximately 80 growers. Each grower was provided with a handheld wireless transponder, commonly referred to as 'clicker technology'. Growers were asked what their

Figure 6. *Cerastium vulgatum,* commonly known as mouse-eared chickweed.

primary crop is: small fruit; tree fruit; vegetables or ornamentals, and to identify eight commonly occurring weeds.

Results & Discussion

The majority of participants, 61%, identified vegetables as their primary crop. The remainder of the participants identified themselves as small fruit growers; 23%, tree fruit; 12% and ornamental producers; 4%.

When growers were asked to identify eight commonly occurring weeds (see Figures 2-9), overall, the majority of the answers were correct. However, specific results were variable. 65% of participants correctly identified *Chenopodium album* (Figure 2, lamb's quarters) whereas 22% responded "I don't know" when asked to identify this weed. 19% of participants correctly identified *Tragopogon dubius* (Figure 3, yellow salsify), 23.5% of participants misidentified it as dandelion. This is an easy mistake to make as they are closely related. Dandelion seedlings, however, emerge earlier in the growing season than salsify. *Rumex obtusifolius* (Figure 4, broadleaf dock) was correctly identified by 64% of participants. 19% responded "I don't know" when asked to identify this weed. 82% of participants correctly identified *Cyperus esculentus* (Figure 5, yellow nutsedge) making it the most recognized weed in the pop quiz. 39% of participants correctly identified *Cerastium vulgatum* (Figure 6, mouse ear chickweed) while 35% responded "I don't know". 40% of respondents correctly identified *Celastrus orbiculatus* (Figure 7, oriental bittersweet).

Figure 7. *Celastrus orbiculatus,* commonly known as oriental bittersweet. Inset photo credit: Randy Prostak, UMass Extension Weed Specialist

Figure 8. *Solanum carolinense*, commonly known as horsenettle.

Figure 9. *Cuscuta spp.* commonly known as dodder shown on cranberry. Inset shows close up of dodder tendril wrapping around a cranberry stem.

5% of the responders chose "the actual devil", an answer that should be considered technically correct given the noxious nature of this invasive weed. 25% responded with "I don't know". *Solanum carolinense* (Figure 8, horsenettle) was correctly identified by 34 % of participants while another 30% identified it as night shade. While horsenettle is in the nightshade family, the use of this as an identifier can muddy the waters of communication. This is why scientific names are often used by educators and scientists when discussing weeds management. Finally, *Cuscuta spp.* (Figure 9, dodder) was successfully identified by only 13% of participants and was misidentified as bindweed by 23%. 39% of growers asked to identify this weed responded "I don't know". Dodder can be a serious pest in tomato, carrot, alfalfa, cranberry and ornamental production.

Conclusions

Proper weed identification is critical to effective and efficient weed management. Knowing what weed species are present in a cropping system is necessary for proper material selection and application timing. The three most recognized weeds in this pop quiz were lamb's quarters, broadleaf dock and yellow nutsedge. More than 50% of participants were able to accurately identify these weeds, especially important for weeds like yellow nutsedge which are difficult to manage.

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