Use of Rights-of-Way by bees: initial research summary from Pennsylvania

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Research at the State Game Lands 33 (SGL 33) and Green Lane right-of-way (ROW) management sites in Pennsylvania is on-going and two field seasons have been completed. In 2016, the first research into native bees and their use of habitat at the SGL 33 site was completed. In early spring 2017, bees collected during 2016 were identified and curated at the Frost Entomological Museum at Penn State, University Park. From that work, researchers noted that bees respond differently to the variety of vegetation treatment approaches used at the ROW. In particular, treatments that used integrated vegetation management and selective herbicide application supported the highest number and diversity of bees (Figure 1). Researchers also noted that bee response to treatments varied across the growing season. In 2017, bees were collected at both SGL 33 and Green Lane and researchers have begun the curation process of these samples. The 2017 data will permit a comparison of bee community response both before vegetation treatments (2016) and after treatment (2017).

In August 2017, two specimens of the Golden Bumble Bee (*Bombus fervidus*) were collected at the ROW on SGL 33 (Figure 2). These specimens were collected in treatment sites where ROW vegetation was managed by using selective herbicide application. *Bombus fervidus* is recognized by the International Union for the Conservation of Nature (IUCN) as a species vulnerable to extinction. This bumble bee species has demonstrated persistent declines in abundance in eastern North America since the 1930s (Colla et al. 2012, IUCN 2017).

Integrated vegetation management (IVM) practices on ROW may include mechanical cutting and/or herbicide treatments to control incompatible plant species. These methods are used to create and maintain stable early successional plant communities. The research indicates that IVM, which may include the use of selective herbicide application, is compatible with supporting native bees.

For more information on this research project, visit: http://sites.psu.edu/transmissionlineecology/

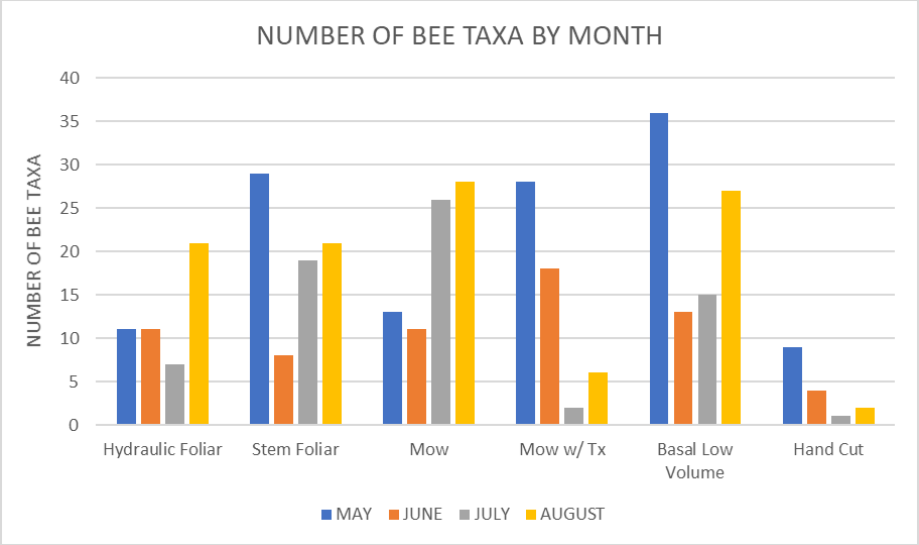

Figure 1. Number of bee taxa (species) collected by month at the State Game Lands 33 (SGL 33) right-of-way (ROW) study sites in 2016. Treatments are: high volume (hydraulic) foliar, ultra low volume foliar (stem foliar), mowing, mowing with herbicide, low volume basal bark (basal low volume), and hand-cutting. In general, treatments with selective herbicide application (stem foliar and basal low volume) supported the highest diversity of bees across the growing season. A detailed description of vegetation treatments are presented at: http://sites.psu.edu/transmissionlineecology/management-practices/

Figure 2. Three bumble bees collected on State Game Lands 33 rights-of-way in August 2017. From left-to-right: *Bombus griseocollis, Bombus impatiens*, and *Bombus fervidus* (Photo: Carl Engstrom).

Colla, S. R., F. Gadallah, L. Richardson, D. Wagner, and L. Gall. 2012. Assessing declines of North American bumble bees (*Bombus* spp.) using museum specimens. Biodiversity and Conservation 21:3585-3595.