Use of ROWs By Bees: Initial Research Summary from Pennsylvania

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Research continues at the State Game Lands 33 (SGL 33) and Green Lane right-of-way (ROW) management sites in Pennsylvania. The first research into native bees and their use of habitat at the SGL 33 site began in 2016. In the early spring of 2017, bees collected during the summer of 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 an integrated vegetation management (IVM) approach with a selective herbicide application supported the highest number and diversity of bees (Figure 1). IVM methods may include the use of mechanical cutting and/or herbicide treatments to control incompatible plant species. These methods are used to create and maintain stable early successional plant communities.

Researchers also noted that bee response to treatments varied across the growing season. In 2017, bees were again collected at both SGL 33 and Green Lane, and researchers have begun the curation process of these samples. The 2017 data will allow a comparison of bee community responses before the vegetation treatments that took place in the late summer of 2016 and after the treatments in the first growing season.

It is noteworthy that two specimens of the Golden Bumble Bee (*Bombus fervidus*) were collected in August 2017 at the ROW on SGL 33 (Figure 2). *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). These specimens were collected in treatment sites where ROW vegetation was managed by using selective herbicide application.

Figure 1. Three bumble bees collected on State Game Lands 33 ROWs in August 2017. From left to right: Bombus griseocollis, Bombus impatiens, and Bombus fervidus (Photo: Carl Engstrom).

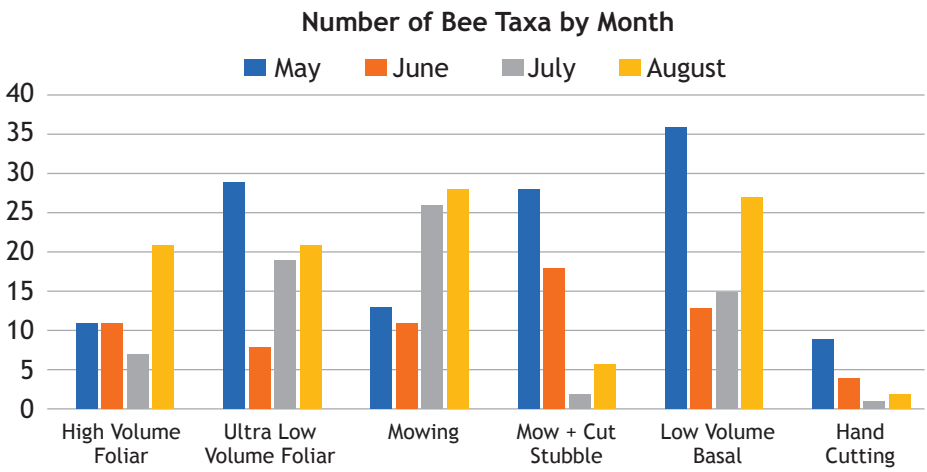

Figure 2. Number of bee taxa (species) collected by month at the State Game Lands 33 (SGL 33) right-of-way (ROW) study sites in 2016. Treatments are: high volume (hydraulic) foliar, ultra, low-volume foliar (stem foliar), mowing, mowing with herbicide application, low volume basal bark (basal low volume), and hand cutting. In general, treatments with selective herbicide application (stem foliar and basal low volume) support the highest diversity of bees across the growing season. A detailed description of vegetation treatments is presented at: http://sites.psu.edu/transmissionlineecology/management-practices/

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

The research indicates that IVM, which may include the use of selective herbicide application, is compatible with supporting native bees.

Reference

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.