



United States Department of Agriculture
Natural Resources Conservation Service

Big Flats Plant Materials Center
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USE OF WILDFLOWERS IN NATIVE GRASS SEEDING MIXTURES TO ENHANCE POLLINATOR HABITAT

Native grasses and wildflowers provide habitat for very diverse wildlife populations of pollinators. Protecting and enhancing habitat for native pollinators as well as managed honey bee colonies, is important for not only these species but for the plants that depend on them for their survival, and is critical for food production and human livelihoods. The United States Department of Agriculture’s Natural Resources Conservation Service (USDA NRCS), Xerces Society of Invertebrate Conservation and other federal and state collaborators, have teamed up to provide outreach on the problems facing pollinator decline such as loss of floral diversity and habitat, increased use of pesticides, climate change, disease, and parasites.

- ❖ Obtained over 50 species of native wildflowers, and seeded each into 6.33 ft x 10 ft plots in June and August of 2009.
- ❖ Each was hand broadcasted, and seed was mixed with play sand.
- ❖ Seed was then raked in and cultipacked, for good seed to soil contact.
- ❖ All plots were evaluated for percent cover well as bloom time, heights, and animal herbivory.
- ❖ June 2009 seeding, half of plots were sprayed with Poast, to control annual grasses. Care was taken to not spray plots with grasses incorporated in them.
- ❖ In April, over the course of 3 years, both seeding dates were burned.

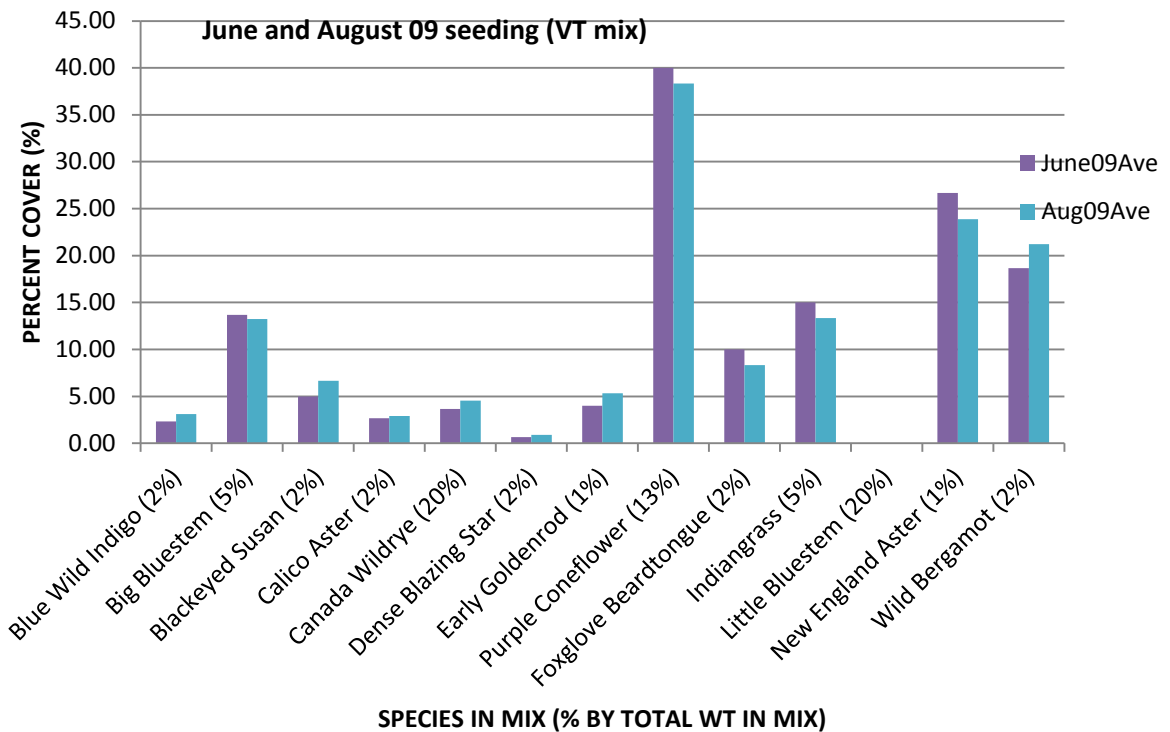


Figure 1: Results from a seeding mixture with Native Warm and Cool Season Grasses.

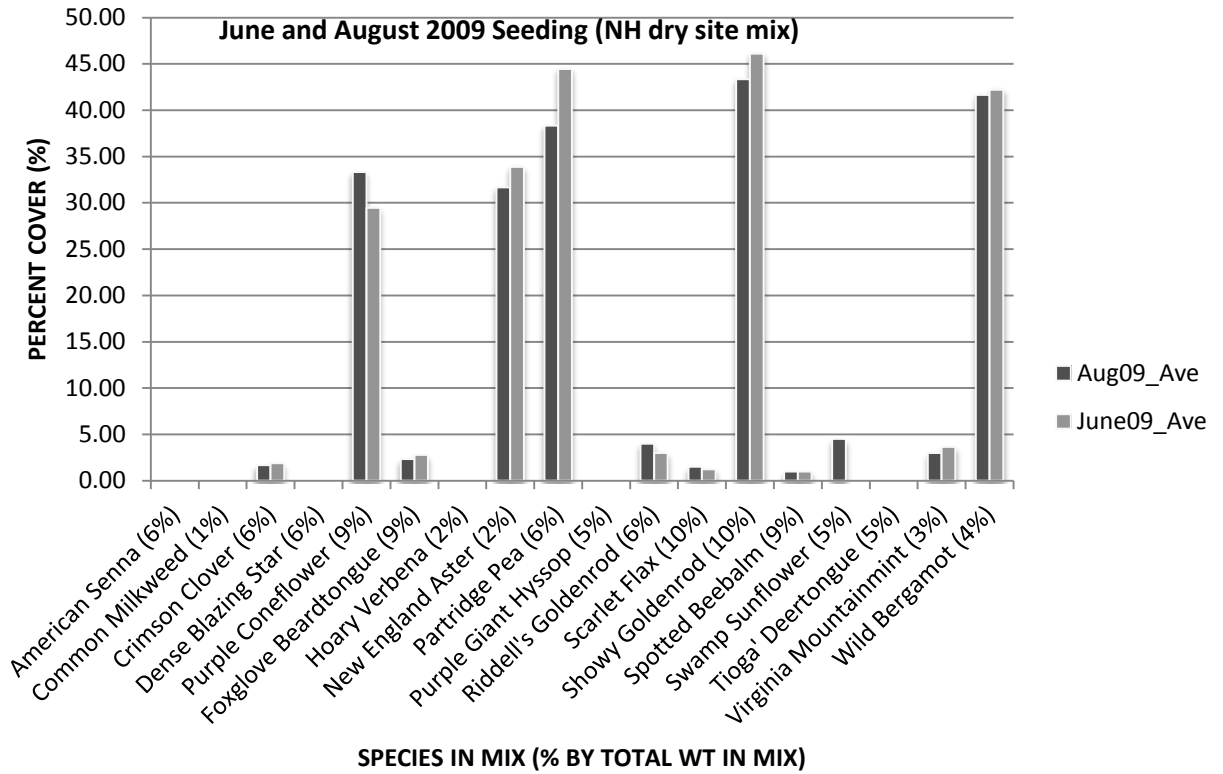


Figure 2: Seeding mixture of a diverse array of wildflowers and warm season grasses.

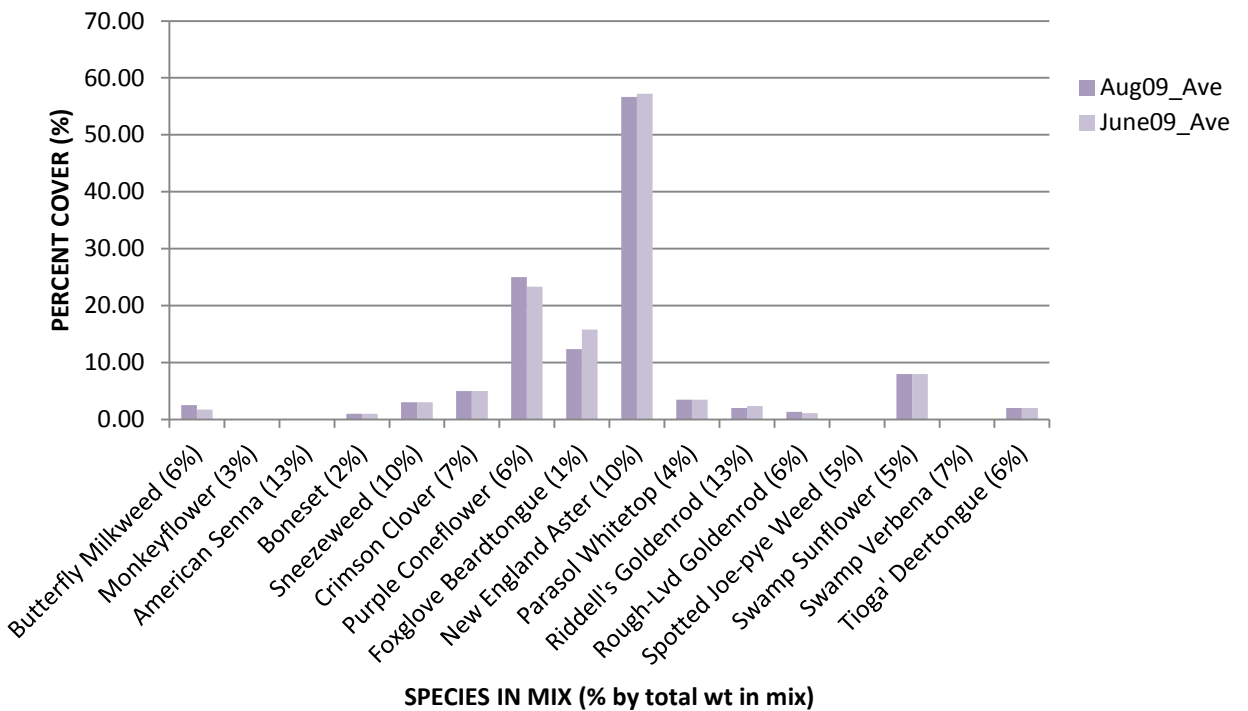


Figure 3: A diverse wildflower mixture, for a wetter site. The site conditions at the Big Flats Plant Materials Center, are drier, and percent cover for these species was a lot lower.

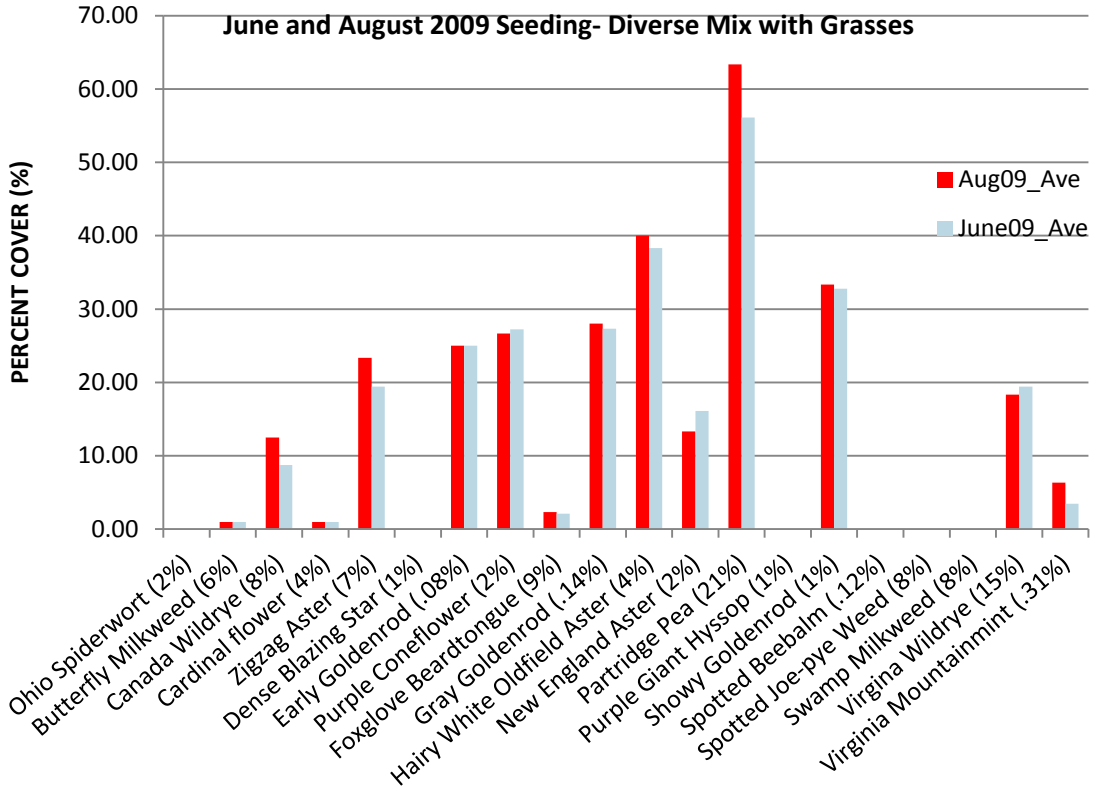


Figure 4: A diverse wildflower mixture with a native cool season grass.

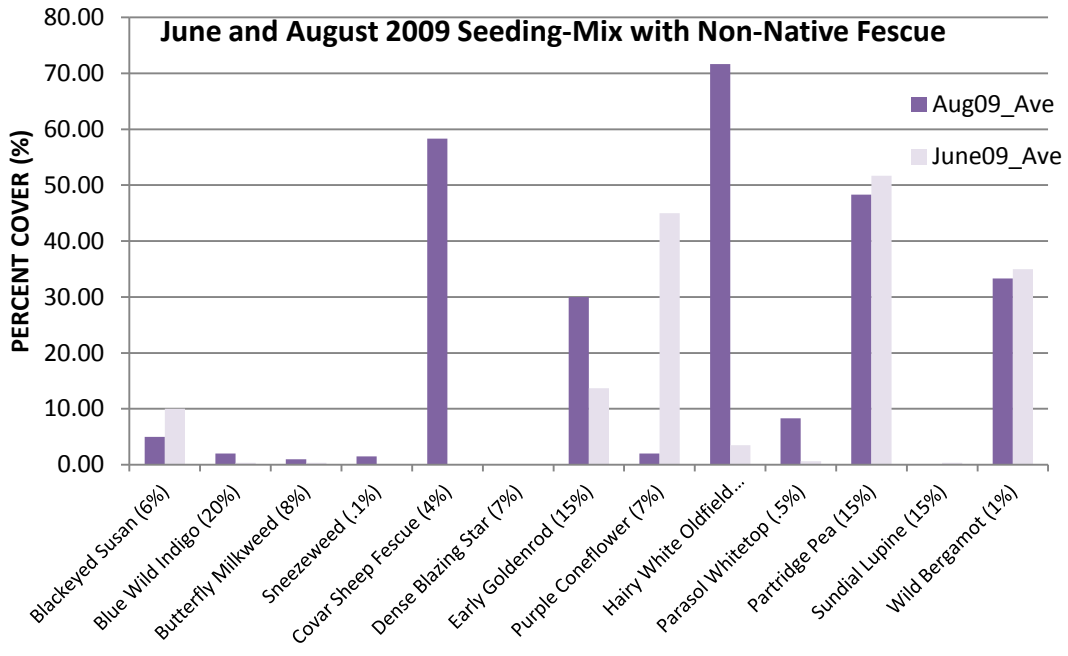


Figure 5: A seeding mixture with a non-native grass species.

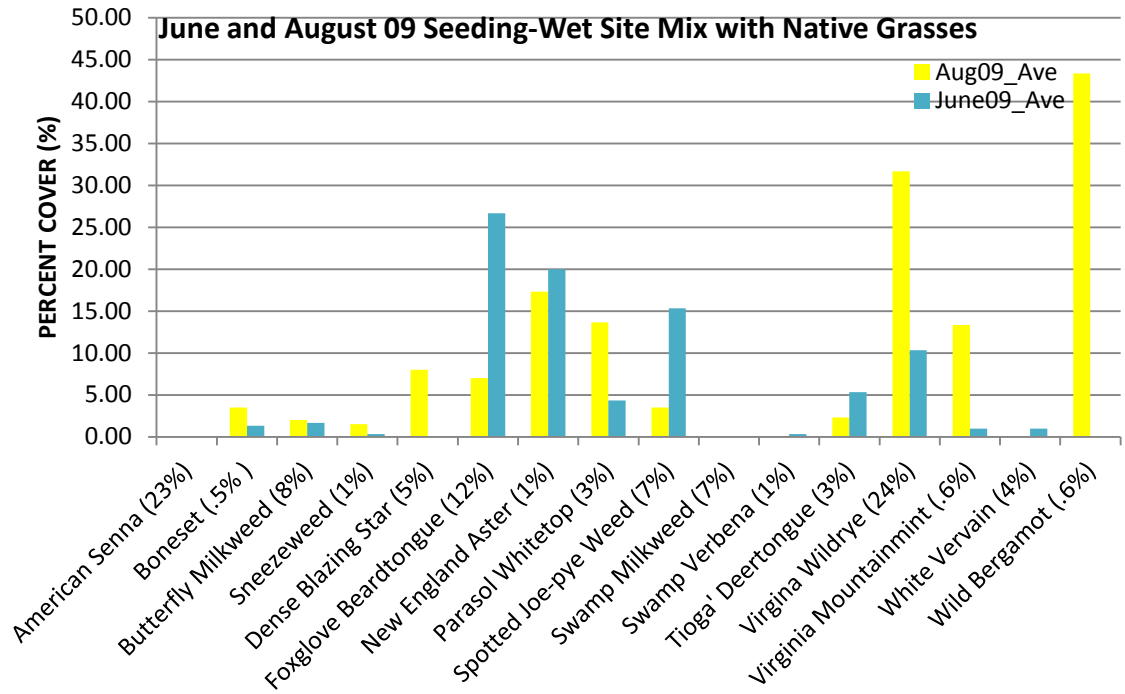


Figure 6: A seeding of wildflower for a mesic site.

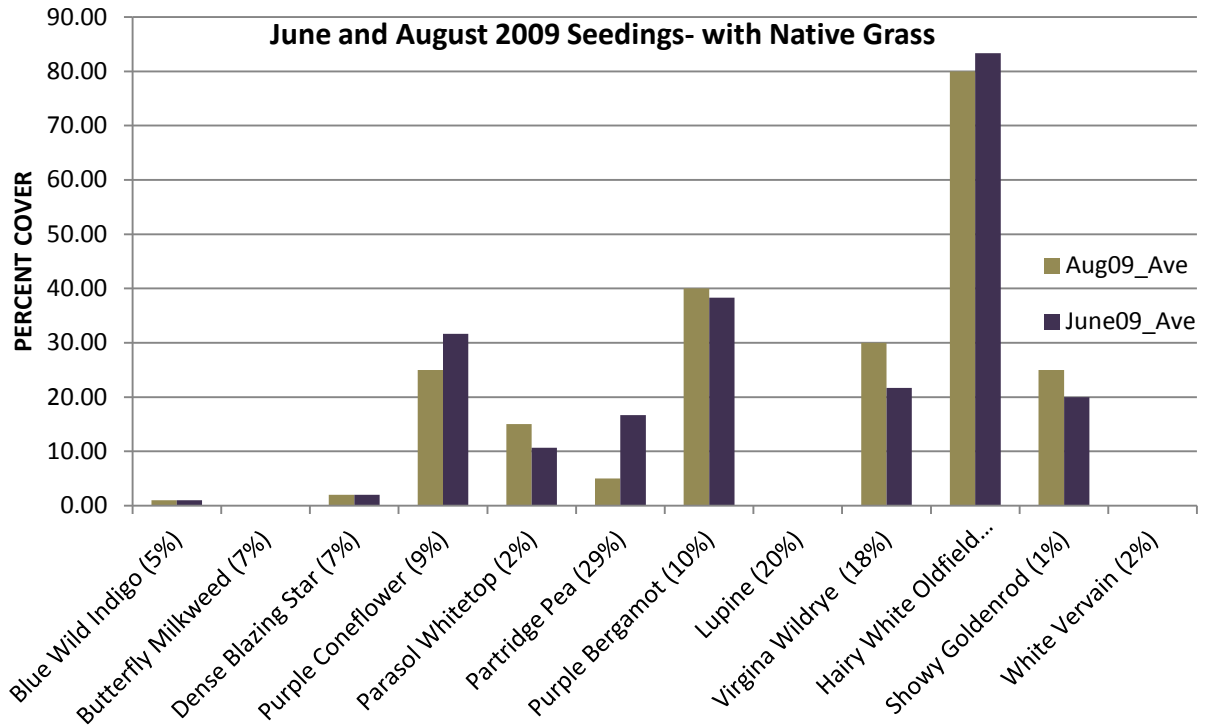


Figure 7: A wildflower seeding mixture with a native cool season grass and quick germination.

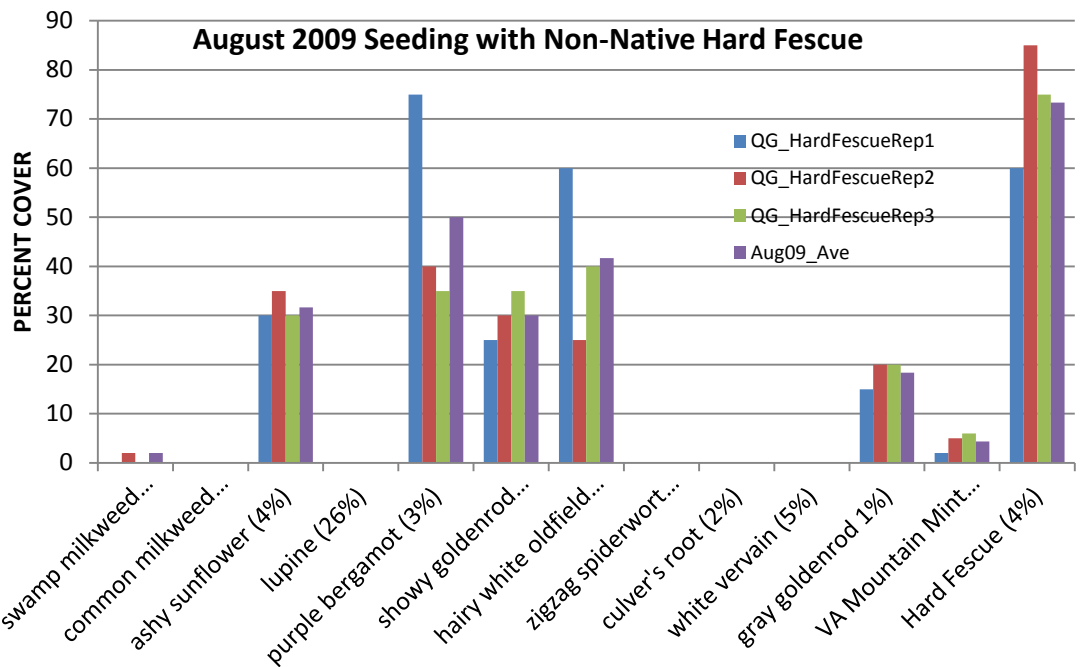


Figure 8: A seeding mixture with a non-native hard fescue. This mixture was only seeded in August of 2009. Most species performed well, and the species that did not persist, are more adapted for wetter habitats.

Discussion:

Using native grasses, as well some bunch-type non-native grasses, and wildflowers to promote and increase pollinator habitat is crucial in ecosystems in and around agricultural communities. Most of the time, using natives in seeding mixtures is very high in cost, making them undesirable in pollinator habitat plantings and restorations. There is also a high risk of failure due to aggressive invasives present, no maintenance regime, and the highly variable environmental and ecological conditions many native forbs species need to germinate successfully, and persist from year to year. Because species differ in traits and range tolerances, seeding mixtures with greater species diversity are more likely to succeed in varying and unpredictable environmental conditions.

The results to date show that mixtures with low densities of grasses and higher densities of forbs species present, showed less weed pressure in these plots, resulting in better habitat for pollinators, such as bumblebees. Care needs to be addressed when compiling seeding mixtures. Aggressive native species such as sunflowers, hairy white old aster, some goldenrods, and partridge pea, should be limited in seed mixes or not used at all, in the case of hairy oldfield aster.

Time of seeding has an effect on weed species present as well as species persistence and ease of establishment. Species when seeded in June got a “head start”, with some flowering in the first year, i.e. sunflowers, spotted bee balm, *Coreopsis* spp. and white vervain. In 2012, August seeded species, have now “caught up” to the early June seeded plots.

There was a strong correlation in the number of species present, when species were seeded in a mixture that contained grass species regardless of time of seeding. The wildryes (25% seeding rate in a mix) are performing as a strong nurse crop, allowing the slower perennials to become established and having more species persist than in plots that did not have any grasses in the mix. Seeding with non-natives, such as hard fescue, produced promising results. Most of the species that did not perform well in these mixes were more adapted to wetter soil conditions, which is not the case at the PMC (Unadilla Silt Loam).

The ease of establishment and persistence chart, portrays the top 32 species, in our studies at the PMC. Most species that have persisted in the past 3 years, are more adapted to dry, well-drained sites and species requiring a wetter habitat, may do better seeded in those types of areas. These results can also be seen, in the mixes as well.

The plots will be evaluated over the next few years, with maintenance, to ensure recommendations for enhancing pollinator habitat are sound, and will provide floristic resources for our important agricultural pollinators.

Conclusions To Date:

- ❖ Time of seeding has an influence on weed species present as well as species establishment and persistence, due to available soil moisture conditions at the time of seeding.
- ❖ Know Your Species that you are seeding in mixes. Rates that are too high or too low will cause a failure in seedings, and may need to be redone, a costly error. In General always use PLS when configuring mixes, and look at the species %'s in your mix, not only by total weight in a mix, but more importantly, in number and % of seeds/square foot. Larger seeded species, will encompass more of a mix by weight, but are less in seeds/square foot and the inverse is true for smaller seeded species. A well thought out mix will be successful along with proper maintenance regimes.
- ❖ Consider the difference among the species being seeded in their germination requirements, phenology, and competitive ability. High dormancy rates in some native forbs, will not give immediate results, so seeding these species with non-aggressive annuals, biennials, and/or fast establishing perennials will allow for a successful long-term planting.
- ❖ Maintaining a site in the initial seeding year and for the next few years, will be needed and the rate and intensity will depend on the site conditions. Allow between 2-4 years to see desired results.