The Intentional & the Accidental:
The Role of Cultivated and Uncultivated Flowers in Supporting Plant Diversity and Insect Abundance on Farms.

Rose Hill Farm Report

Farmer-Ecologist Research Circle
Feb. 2026

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Farm Description

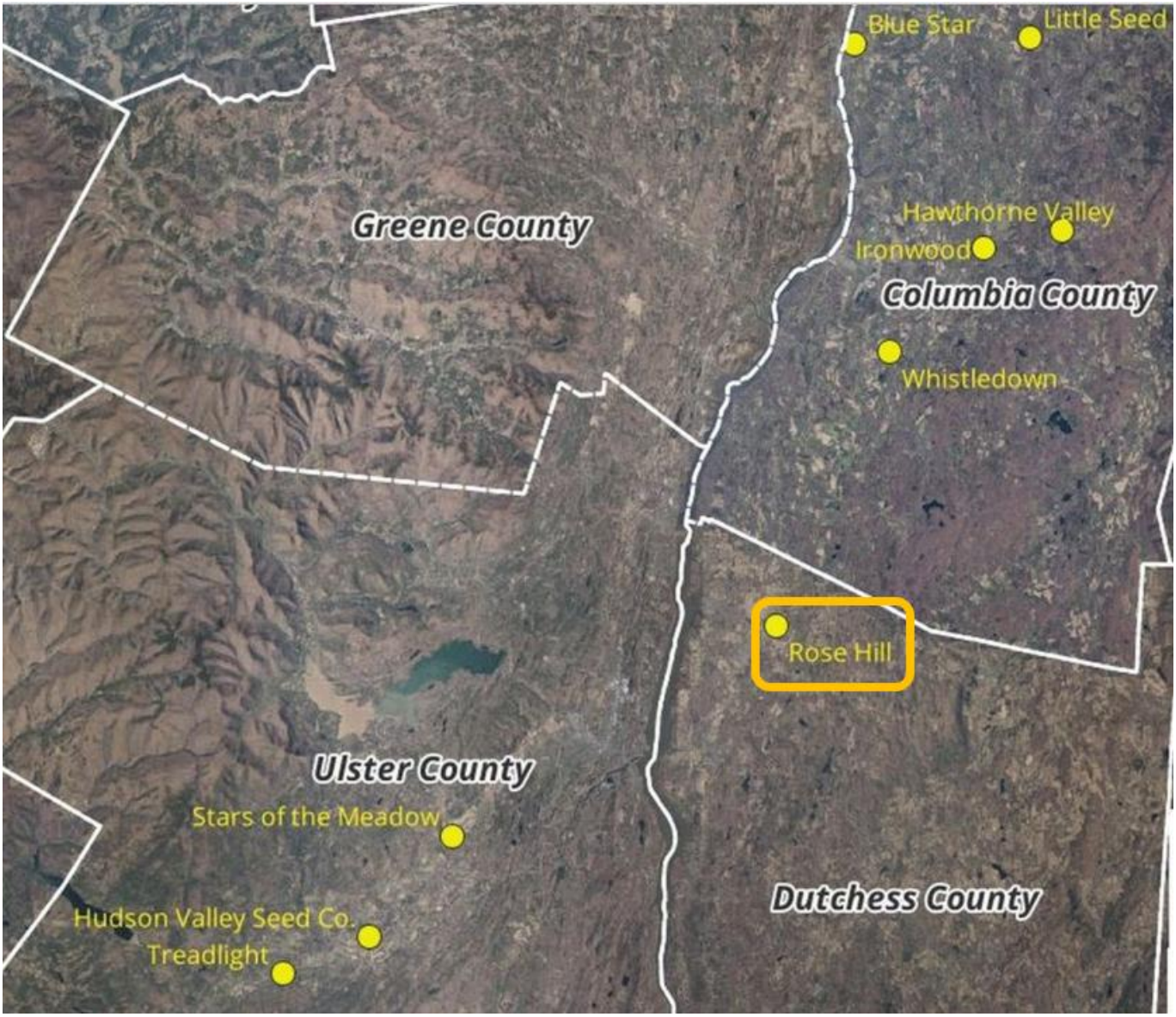


Figure 1. Rose Hill is located in northwest Dutchess County.

Rose Hill Farm is a roughly 114 acre fruit farm in Red Hook NY. It produces apples, peaches, plums, cherries, apricots and blueberries using IPM methods. You-pick cut flowers are also grown. We studied approximately 6.8 Acres of this farm. Our study area was divided into two sections, one roughly due south of the main parking lot and the other to the NNW of the parking lot. The survey units (Fig. 2) usually encompassed fruit crop production (mainly apples and blueberries within our study area), mowed lawn, cultivated flowers, cover crop, short-term fallow, and wilder areas. The wilder areas included a small orchid-bearing wet meadow in the southwest portion of the study area; a narrow, but diverse pond shore; and a swale in the

northern portion of the study area that harbors native plants not found in any of the other survey units.

Botany

A total of 116 different flowers were found within the two sections studied at Rose Hill (see Appendix). Please remember that this does NOT represent a full botanical inventory of the studied portion of this farm – it only includes those plants actually seen in flower during our three survey outings. The plant list in the Appendix includes all species we have observed in bloom during our 2025 inventories in the survey units on June 20 (“June”), Aug. 1 (“July”), and Sept. 16 (“Aug/Sept”). The list is organized alphabetically by common name. It also includes rows with (1) the scientific name of each species, (2) its native status (when known), (3) its regional rarity, (4) its ubiquity across the survey units at Rose Hill Farm during its flowering season, (5) duration of its observed flowering season at this farm, and (6) the specific months when it was observed flowering. Please see the caption of the Appendix for more details.

We were excited to find a number of regionally rare/uncommon native plants growing wild at Rose Hill. In the southern study area, Yellow Stargrass was flowering throughout the season in the wet meadow, along the fence, and even—at times—in the mowed area west of the Blueberries. Northern Tubercled Orchid and Narrow-leaved Blue-eyed-grass were flowering in the wet meadow in June. Virginia Mountain-mint was flowering in the wet meadow as well as on the dry slope from late July through mid September. Spiked Lobelia bloomed in the mowed area next to the pond in June and another orchid species, Southern Slender Ladies’-tresses, bloomed in mid September in the unmowed pond edge. Clammy Ground-cherry flowered as a weed in the seeded sunflowers in late July. In the southern section of the study area, two regionally uncommon plant species, Small-flowered Agalinis and Willow-leaved Aster, bloomed in mid September in the wet meadow swale.

Overall, Rose Hill Farm harbored a large number (27 species) and proportion (23% of its total 116 species) of unique flowers not observed at any of the other farms. They were all wild-growing flower species, two-thirds of them native.

Figure 3 shows the number of flowering species at Rose Hill during our three monthly visits in 2025. The species were grouped into four categories: wild-growing, native species; wild-growing, non-native species and wild-growing species we were unable to identify with certainty as native; cultivated native species; and cultivated non-native species.

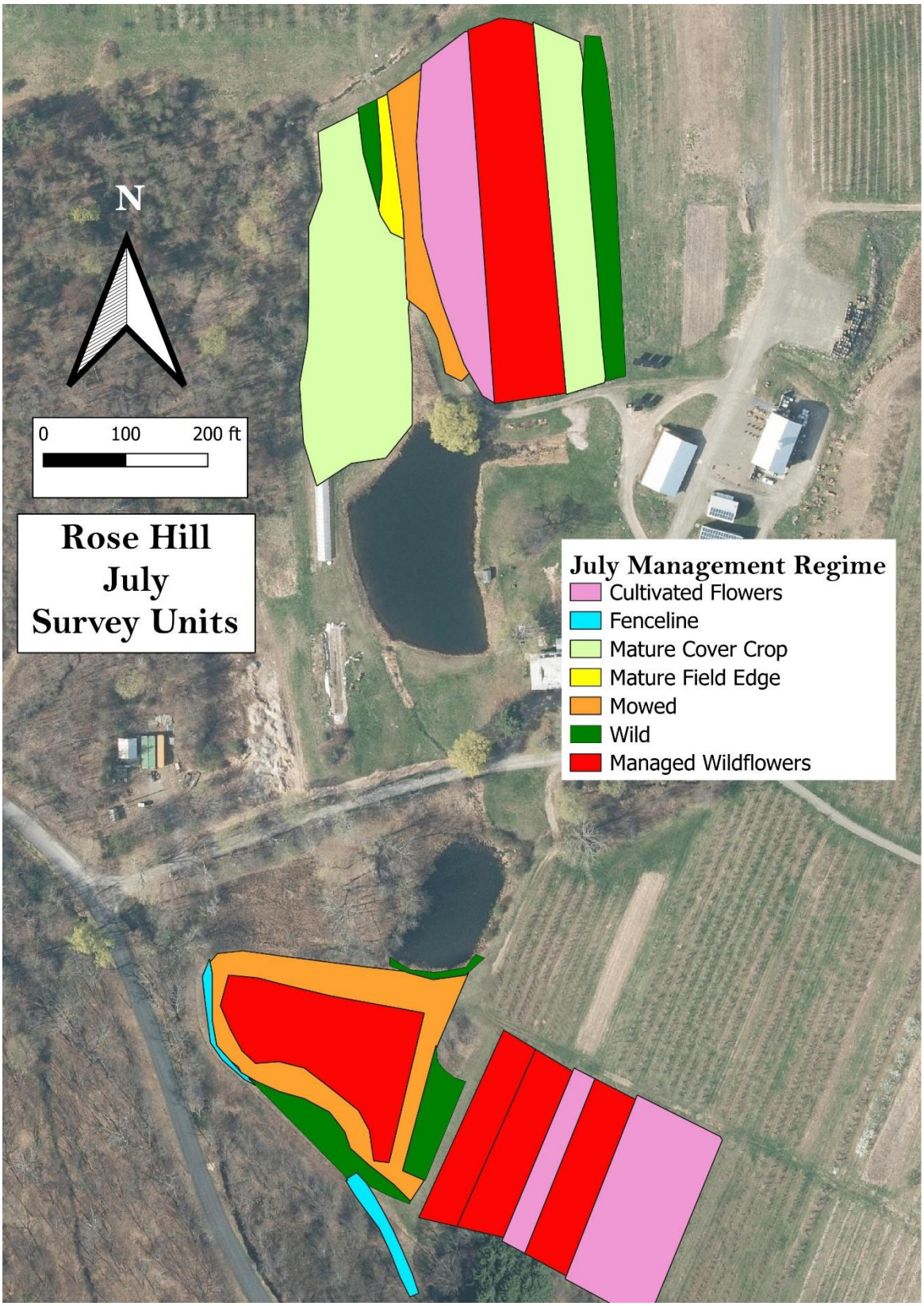


Figure 2. Generalized management regimes in the Rose Hill survey units during July.

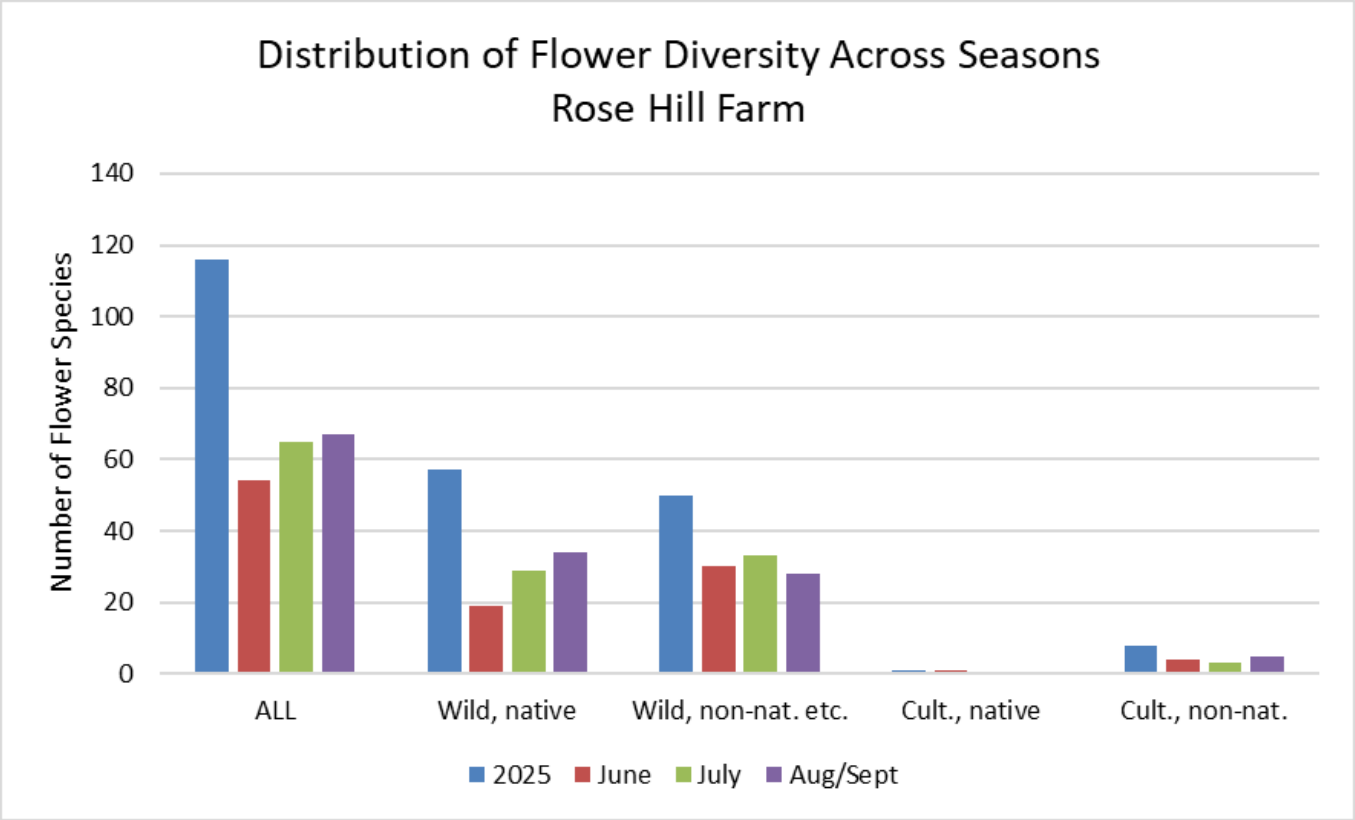


Figure 3. Distribution of flower diversity across the season at Rose Hill Farm

Most of the plants that bloomed from June to Aug/Sept at Rose Hill were wild-growing plants. As in most farms we studied in 2025, the diversity of all plants in bloom increased from June to Aug/Sept. However, this pattern was mostly driven by the wild-growing, native species. The diversity of wild-growing, non-native species in bloom peaked in mid-summer.

Figures 4 and 5 illustrate how much more wild-growing plants contributed to the flower diversity in the survey units at Rose Hill Farm across the season.

Figures 6 and 7 illustrate that flower diversity and abundance change quite independently of each other between survey units and across time. Survey units can have a high abundance of the flowers of a few species. They can also have a lot of species with few flowers each.

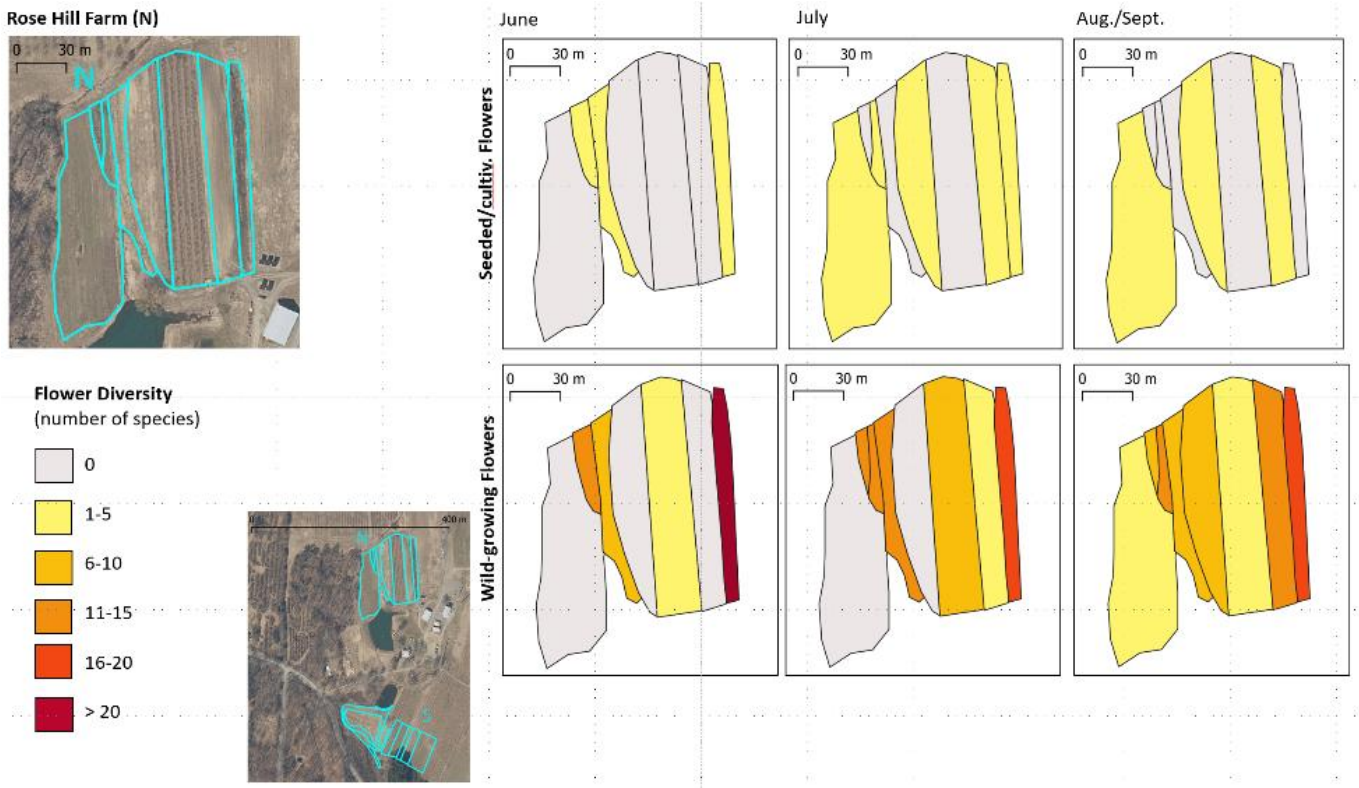


Figure 4. Comparative diversity of seeded/cultivated flowers (above) and wild-growing flowers (below) in the northern survey units at Rose Hill.

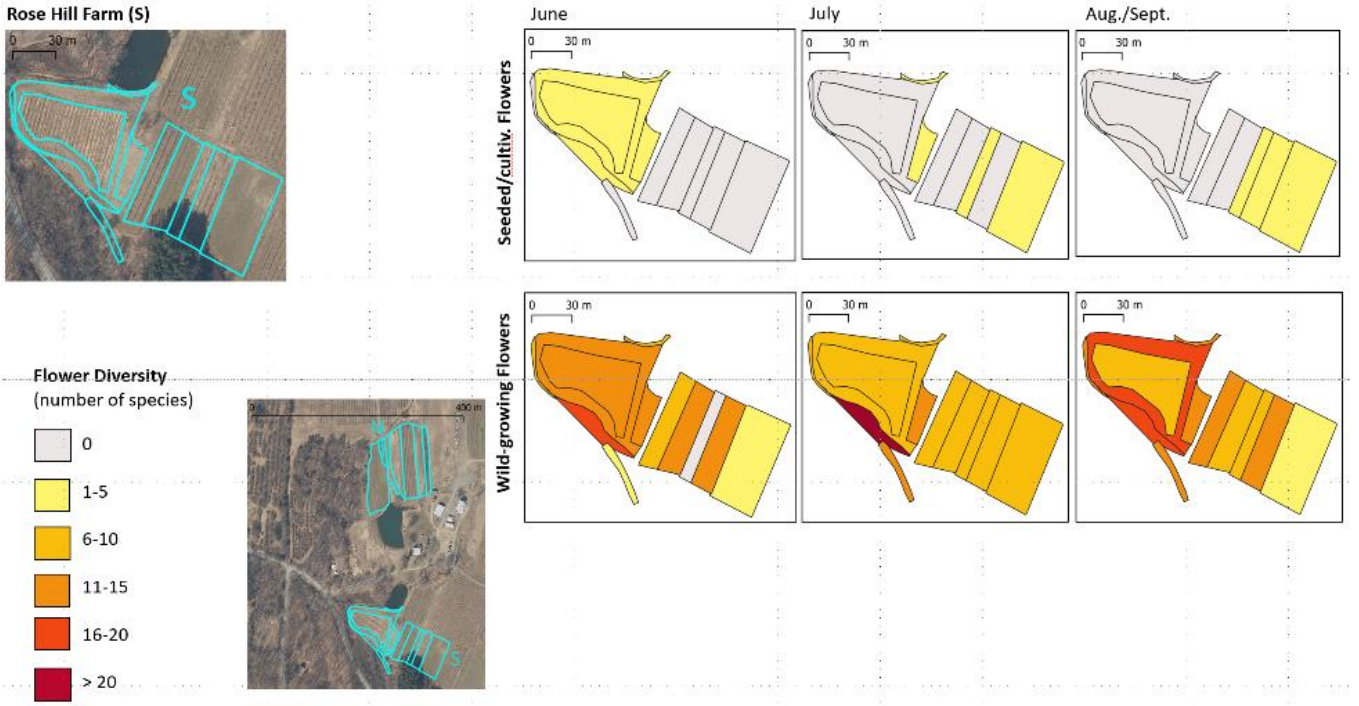


Figure 5. Comparative diversity of seeded/cultivated flowers (above) and wild-growing flowers (below) in the southern survey units at Rose Hill.

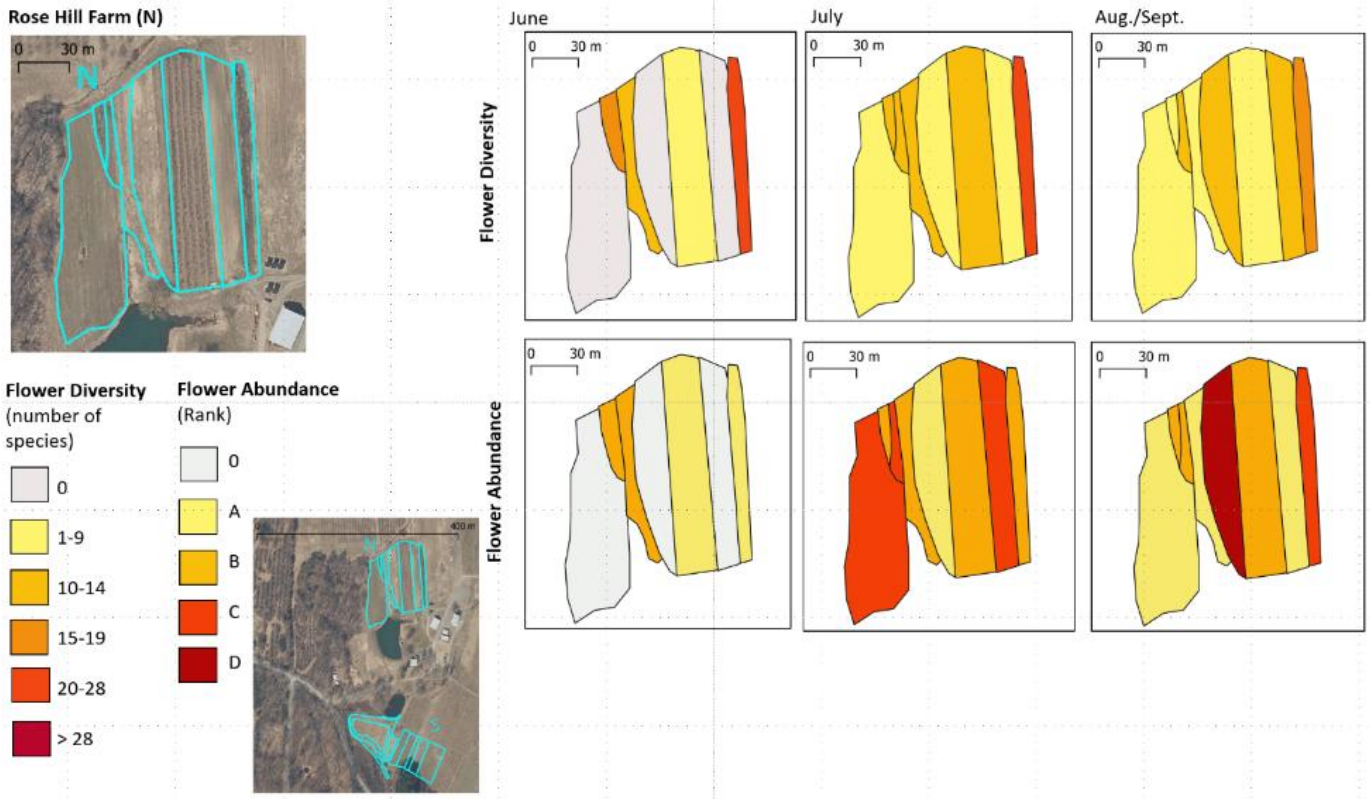


Figure 6. Flower diversity (row of maps above) and abundance (row of maps below) in the northern survey units at Rose Hill. Claudia ranked flower abundances from A (least) to D (most) and also had a zero category.

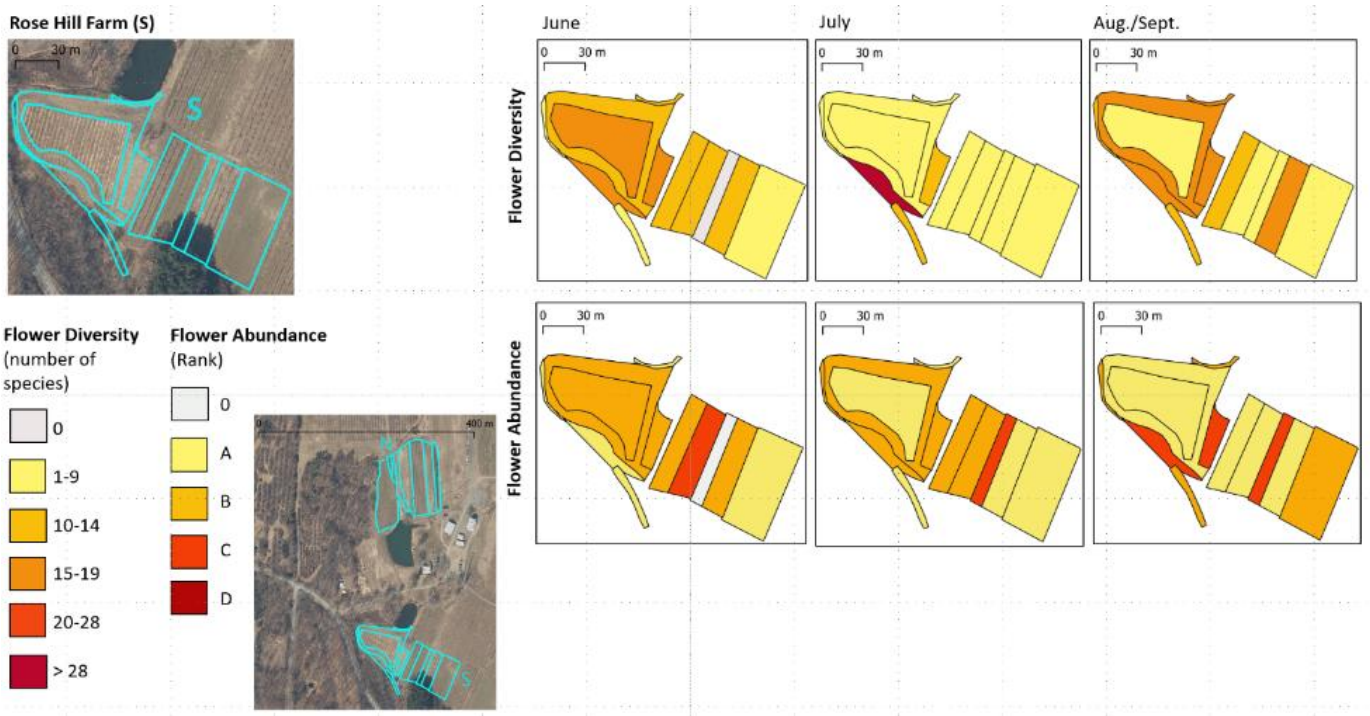


Figure 7. Flower diversity (row of maps above) and abundance (row of maps below) in the southern survey units at Rose Hill. Claudia ranked flower abundances from A (least) to D (most) and also had a zero category.

For example, note the consistently high flower diversity in the wet meadow swale (eastern unit of the study area in the north section of Rose Hill; Fig. 6, upper row) in contrast with its slowly increasing flower abundance across the season (Fig. 6, lower row). In July, flower abundance was higher in the two mature cover crops. In Aug/Sept., the flower abundance in the wet meadow swale was surpassed by that in the field of cultivated annual flowers.

In the southern section of the study area, the wet meadow along the southern fence had its highest flower diversity in late July, but its flower abundance increased throughout the season.

Flower Visitor Community.

Rose Hill tended to be below average in rates of observation, especially for 'other' bees, although values for bumble bees and wasps were around average (Figure 8).

In our somewhat anecdotal but more detailed data on who the 'other' bees were, Rose Hill seemed to have relatively high numbers of green sweat bees (probably mainly the genera *Agapostemon* and/or *Augocholora*). Sightings of smaller bees such as *Hylaeus* and *Lasioglossum* were few. The carpenter bees – Xyclopa (the big, bore-into-your-rafters model) and Ceratina (the small, metallic one) – were present but not common.

Flower-favorability Data & Maps

For convenience, the flower favorability table from the main blog is repeated in Table 1, even though those data are a summary of observations across all farms and outings.

Figures 9A-F show the flower favorability maps for Rose Hill. By glancing over the following maps, one gets the impression that bumble bees (Fig. 9A) should be relatively favored, while hover flies (Fig. 9F), for example, are not. This impression is somewhat confirmed by inspection of Fig. 10 showing Rose Hill's relative flower favorability scores.

Management Considerations

Whether the above observations prompt management considerations depends, in part, on the importance attached to the aphid-controlling habits of many hover fly larvae. Aphids are a relevant pest of apples and hover flies can help control them. Were one interested in augmenting hover fly resources, one might consider planting more of the flowers listed in the hover fly column of Table 1.

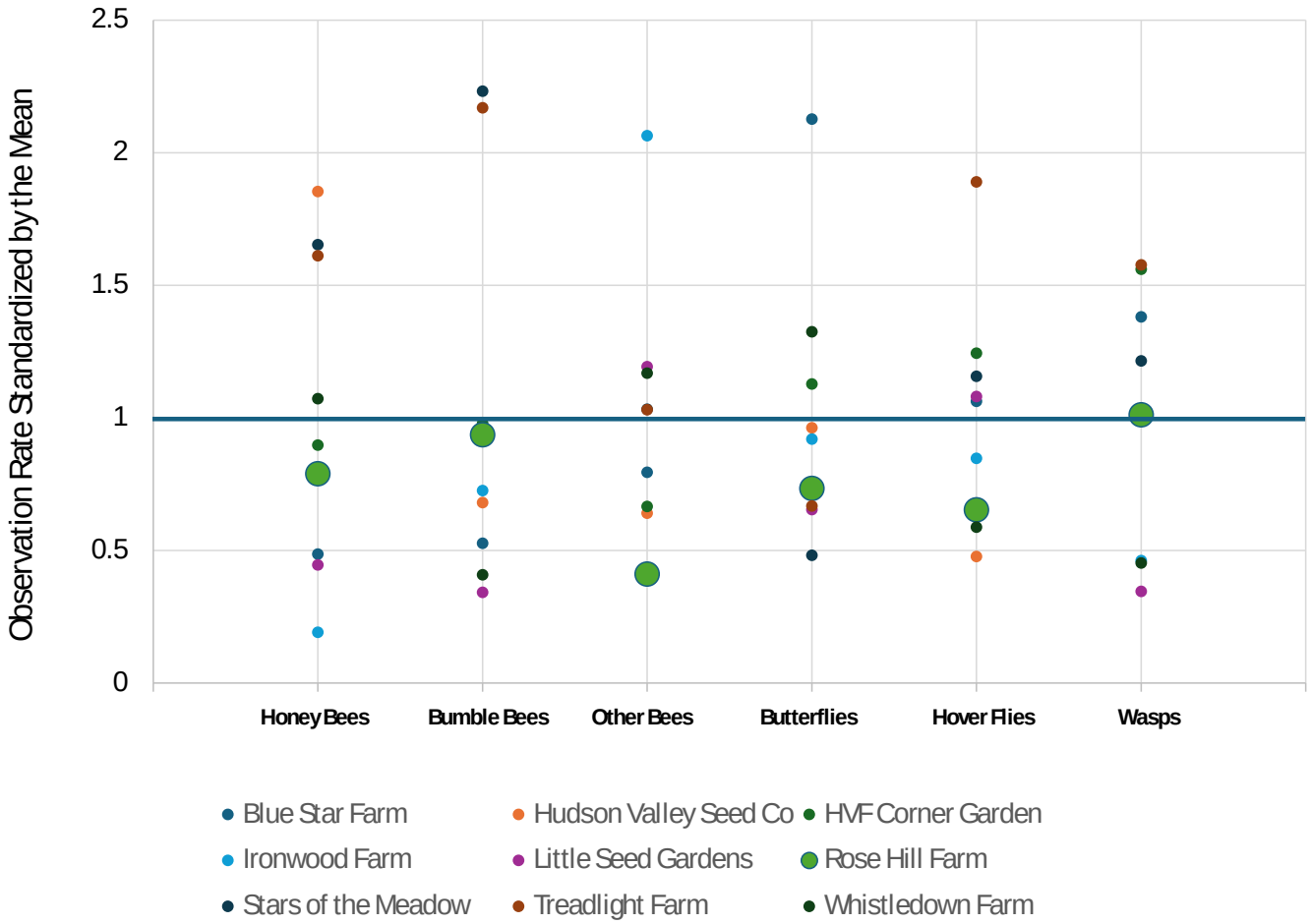
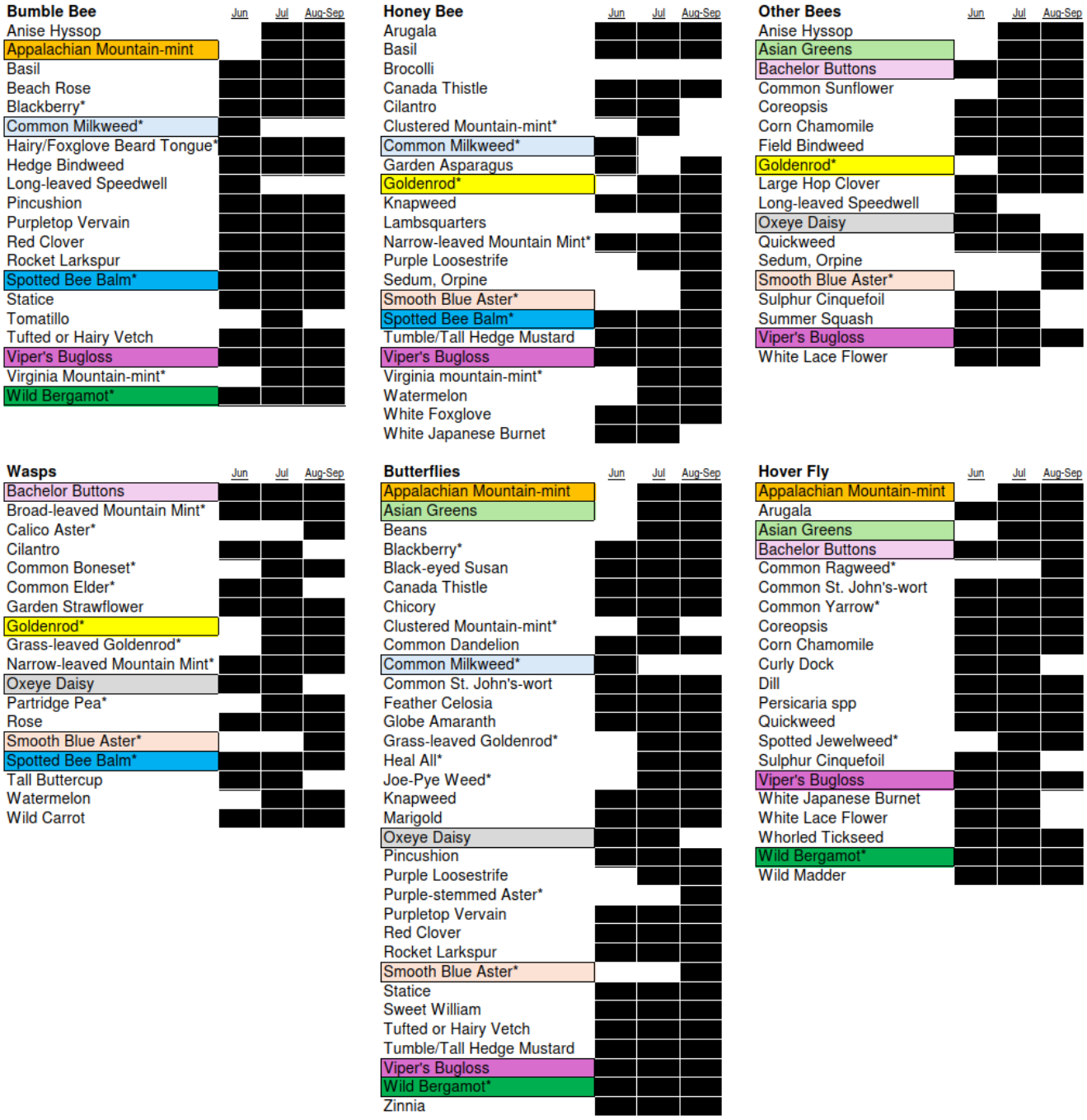


Figure 8. The standardized Rose Hill observation rates for the various insect groups relative to the mean for all farms (the solid line at 1).

Table 1. Most favored plants by our six insect groups, based on data from all farms and all outings. Lists are alphabetical and only include those flowers with notably higher than average visitation rates by the given groups. Plant species native to the Hudson Valley are marked with an asterisk. Colored boxes highlight those species found on three or more lists. Black blocking indicates flowering times observed during the season.



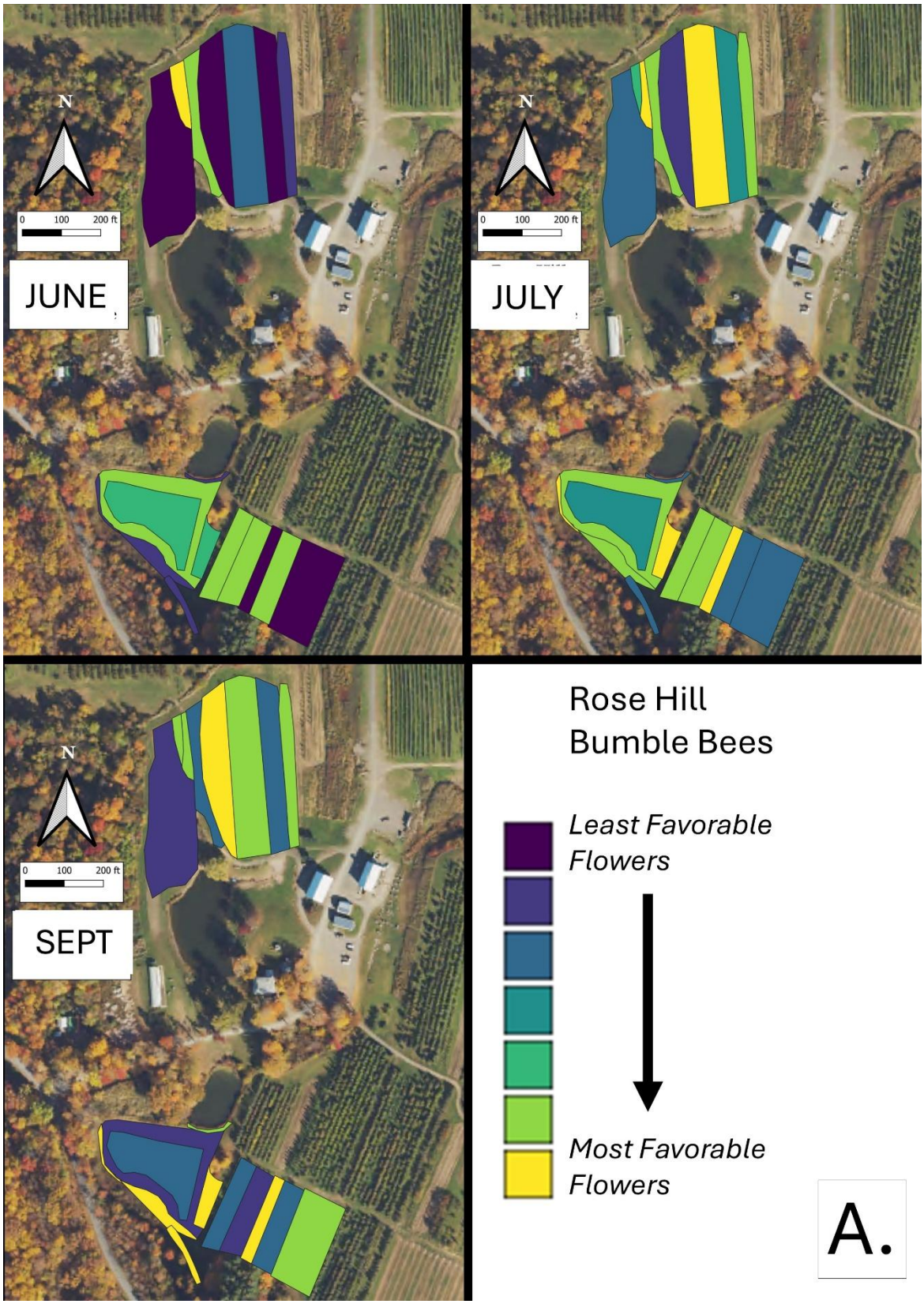


Figure 9A. Flower favorability for bumble bees in the different survey units and different months at Rose Hill. Generally, darker signifies less favored flowers, and lighter colors mean more favored.

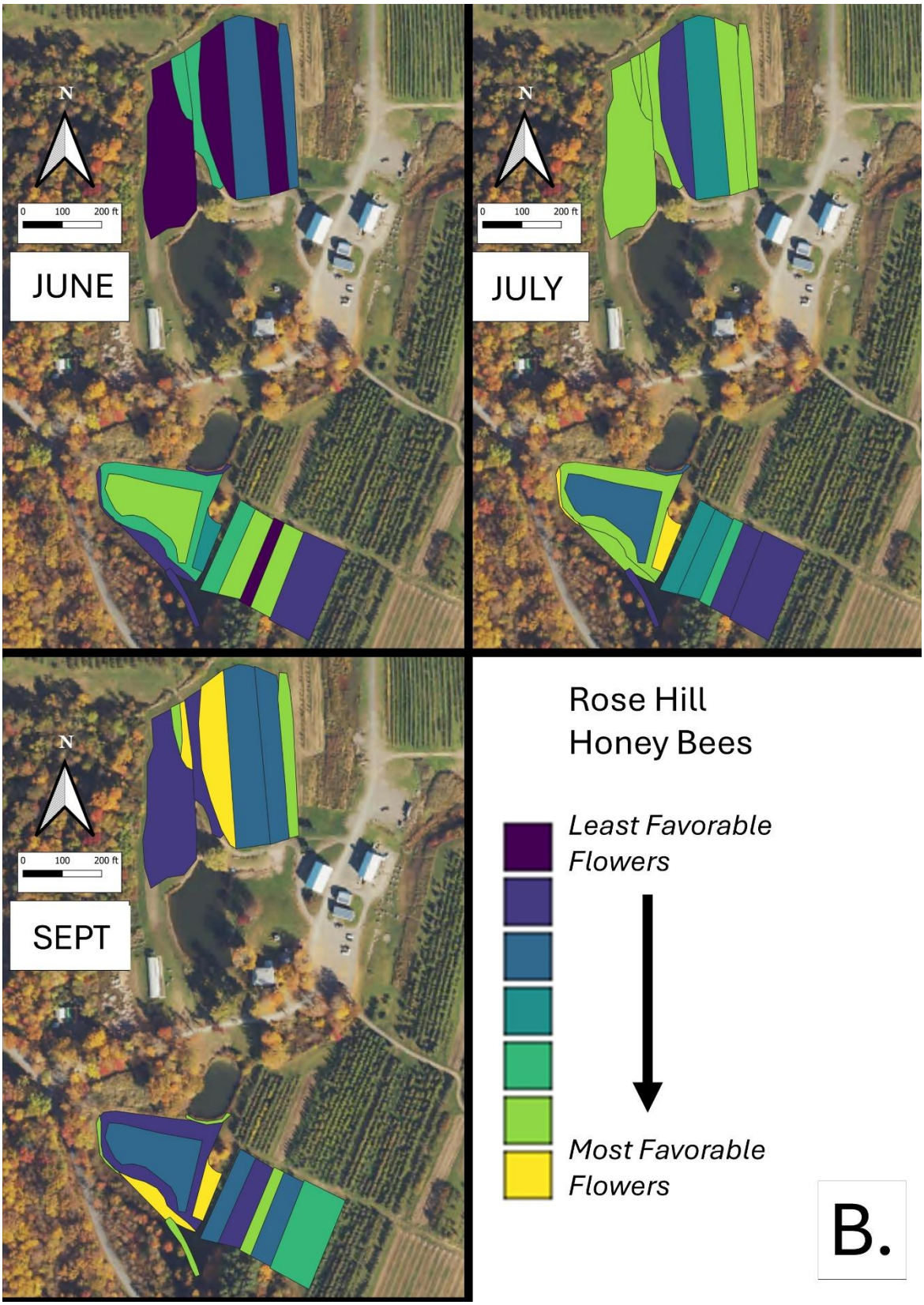


Figure 9B. Flower favorability for Honey Bees in the different survey units and different months at Rose Hill. Generally, darker signifies less favored flowers, and lighter colors mean more favored.

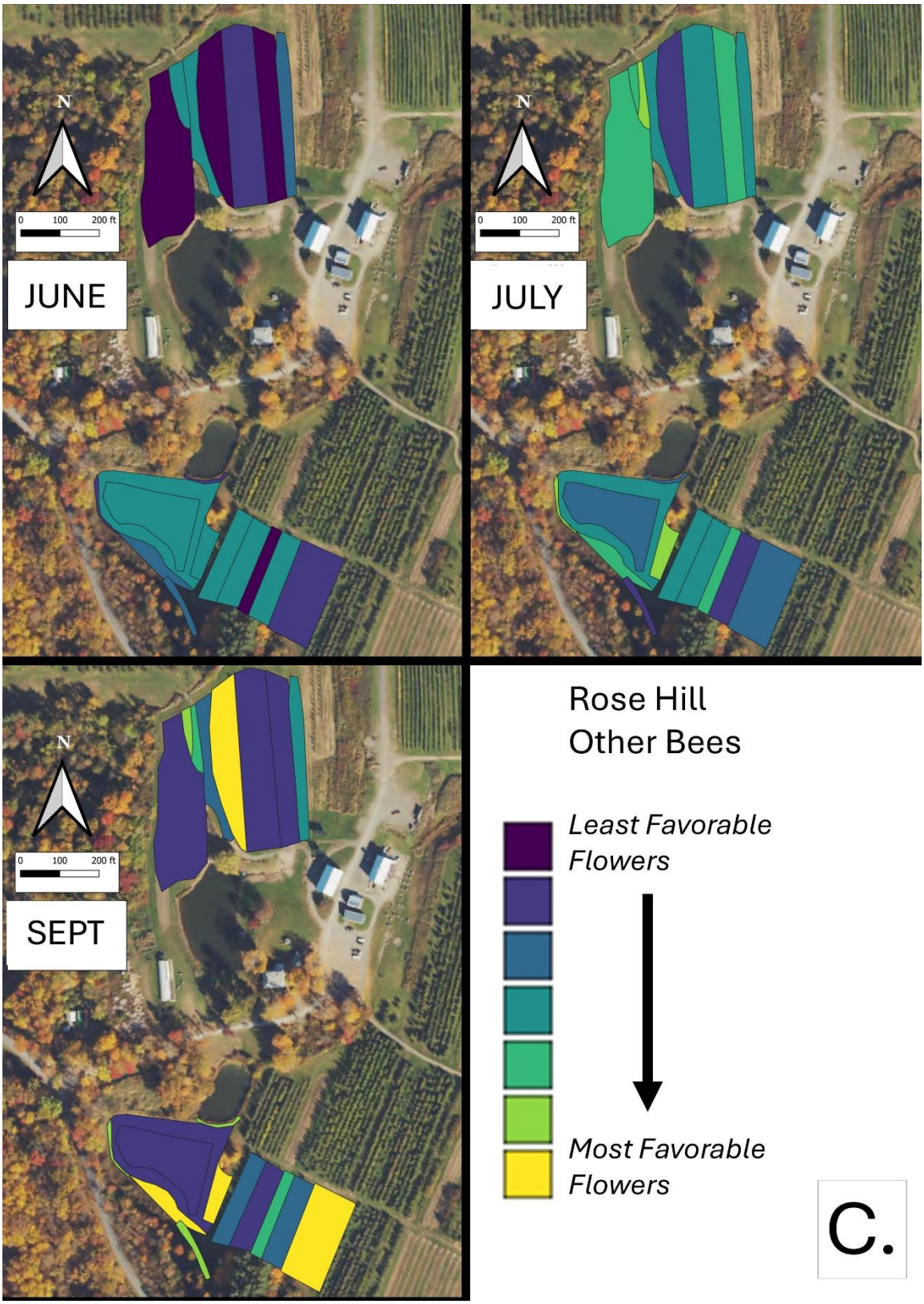


Figure 9C. Flower favorability for 'other' bees in the different survey units and different months at Rose Hill. Generally, darker signifies less favored flowers, and lighter colors mean more favored.

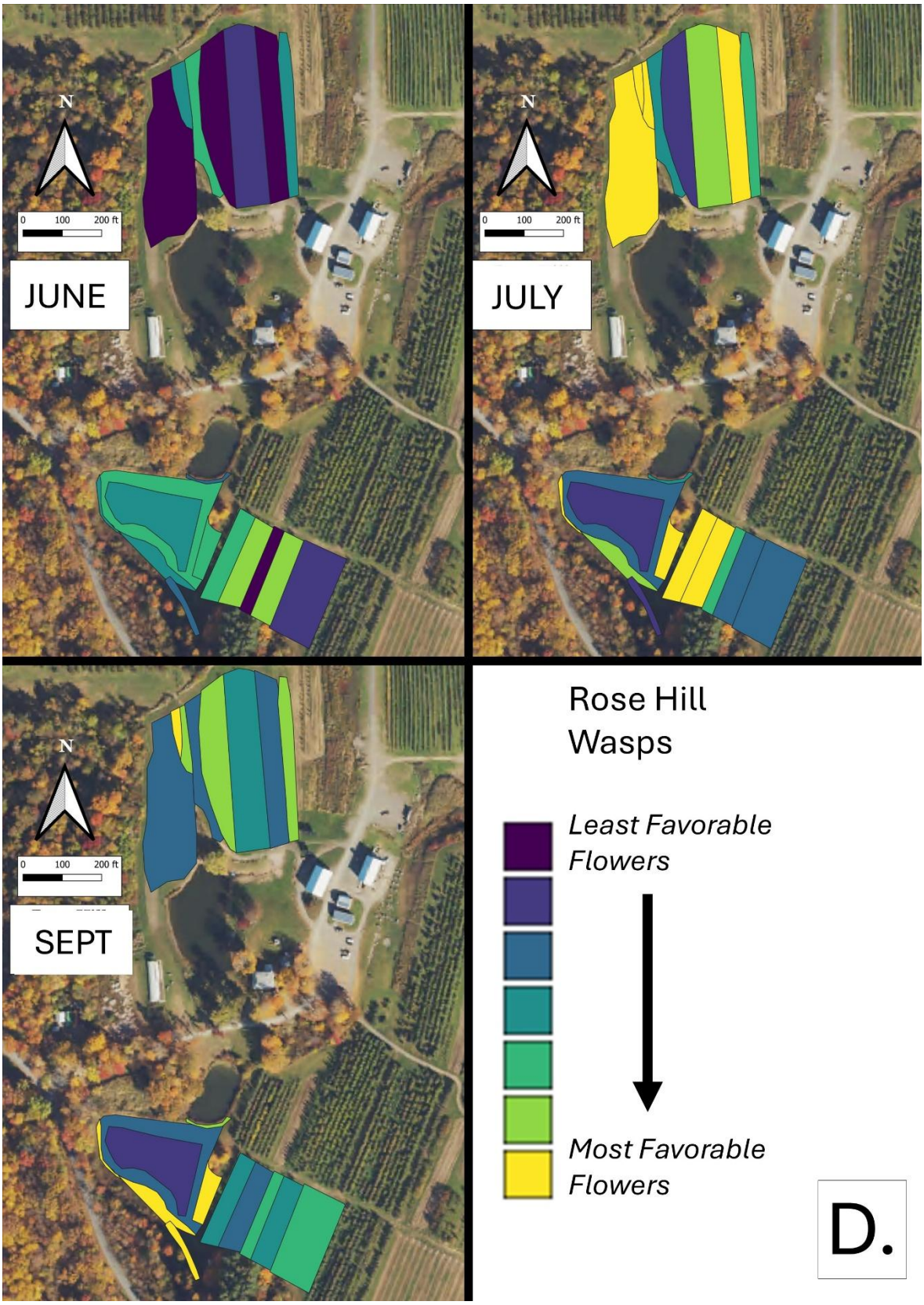


Figure 9D. 9Flower favorability for wasps in the different survey units and different months at Rose Hill. Generally, darker signifies less favored flowers, and lighter colors mean more favored.

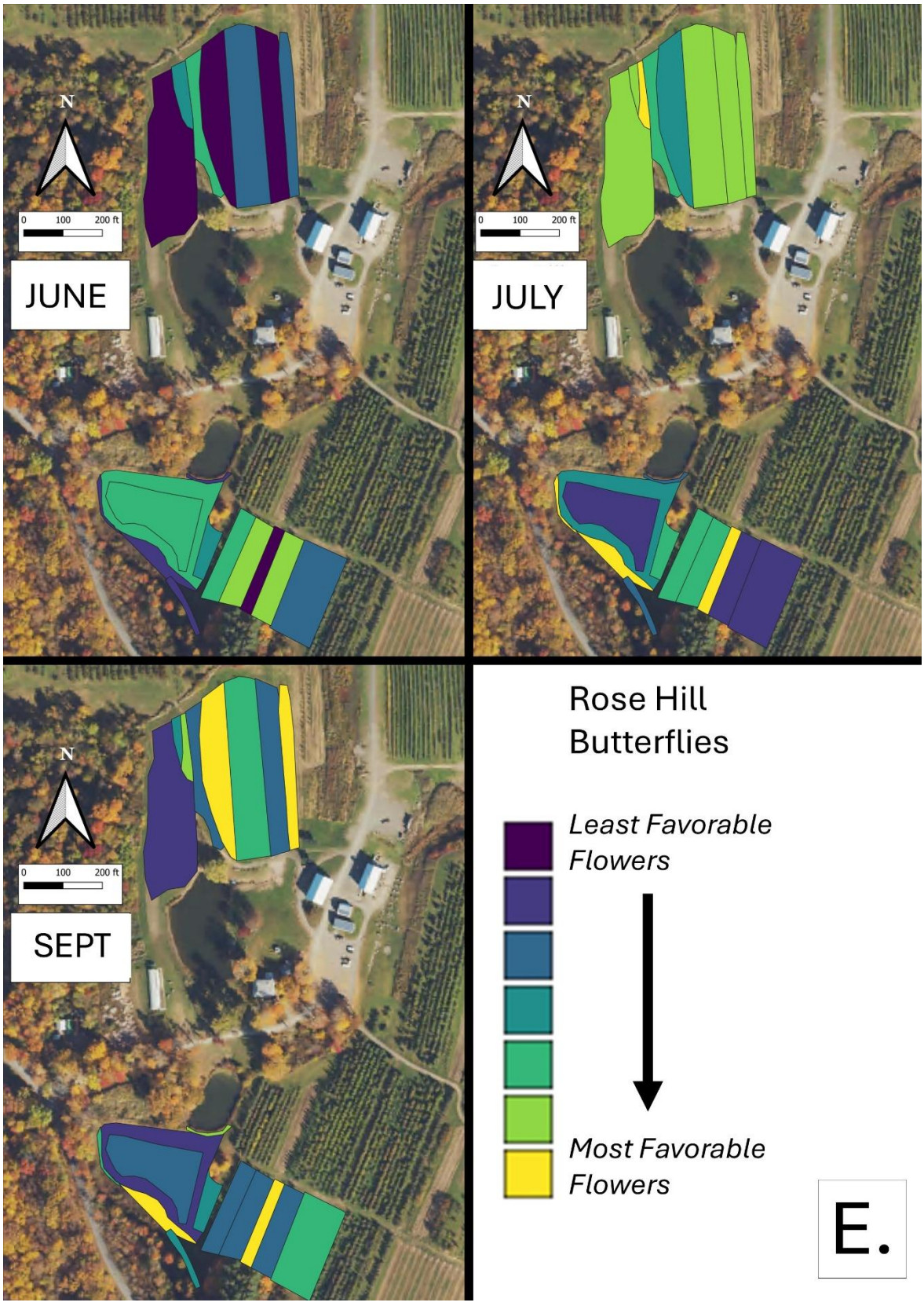


Figure 9E. Flower favorability for butterflies in the different survey units and different months at Rose Hill. Generally, darker signifies less favored flowers, and lighter colors mean more favored.

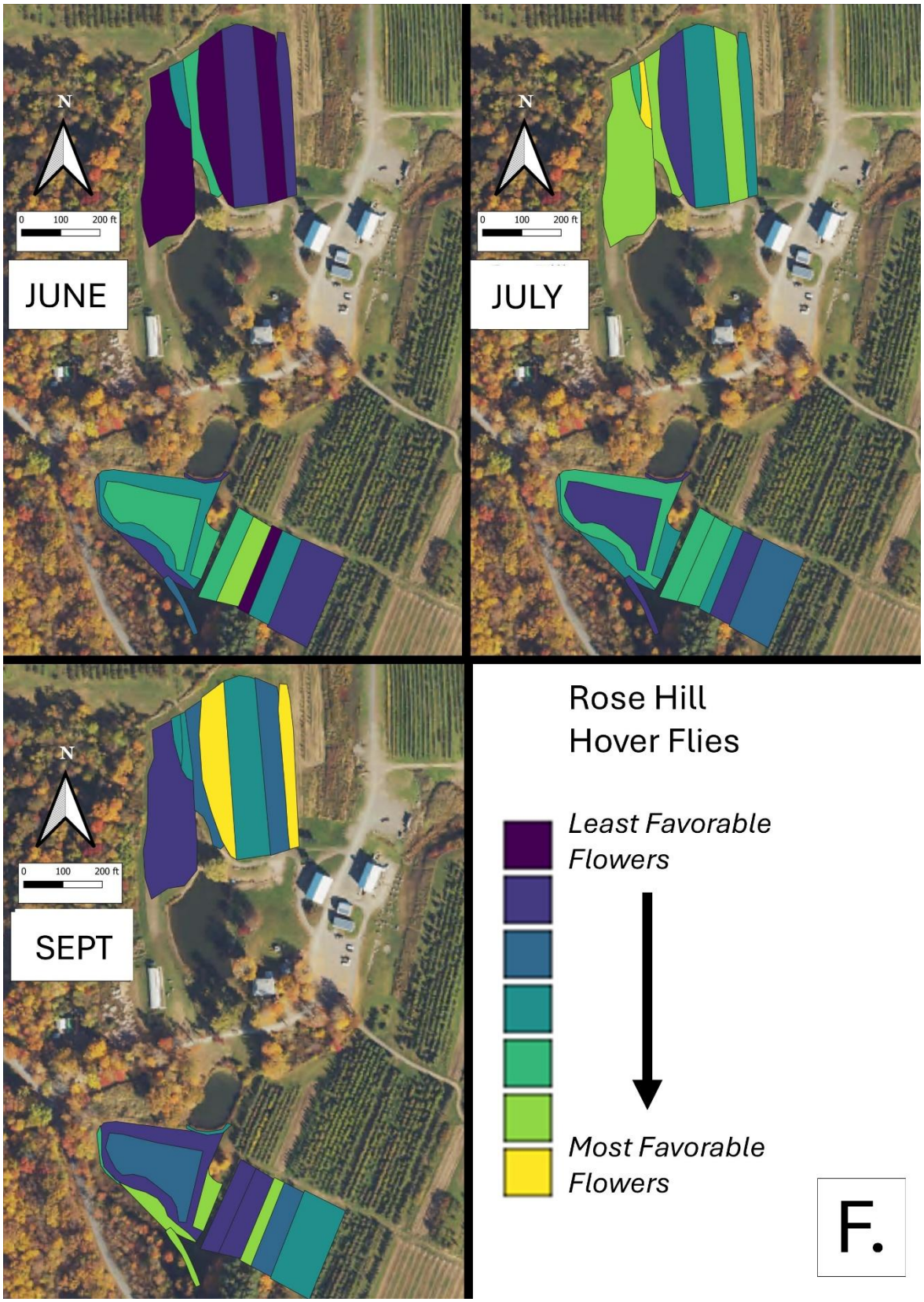


Figure 9F. Flower favorability for hover flies in the different survey units and different months at Rose Hill. Generally, darker signifies less favored flowers, and lighter colors mean more favored.

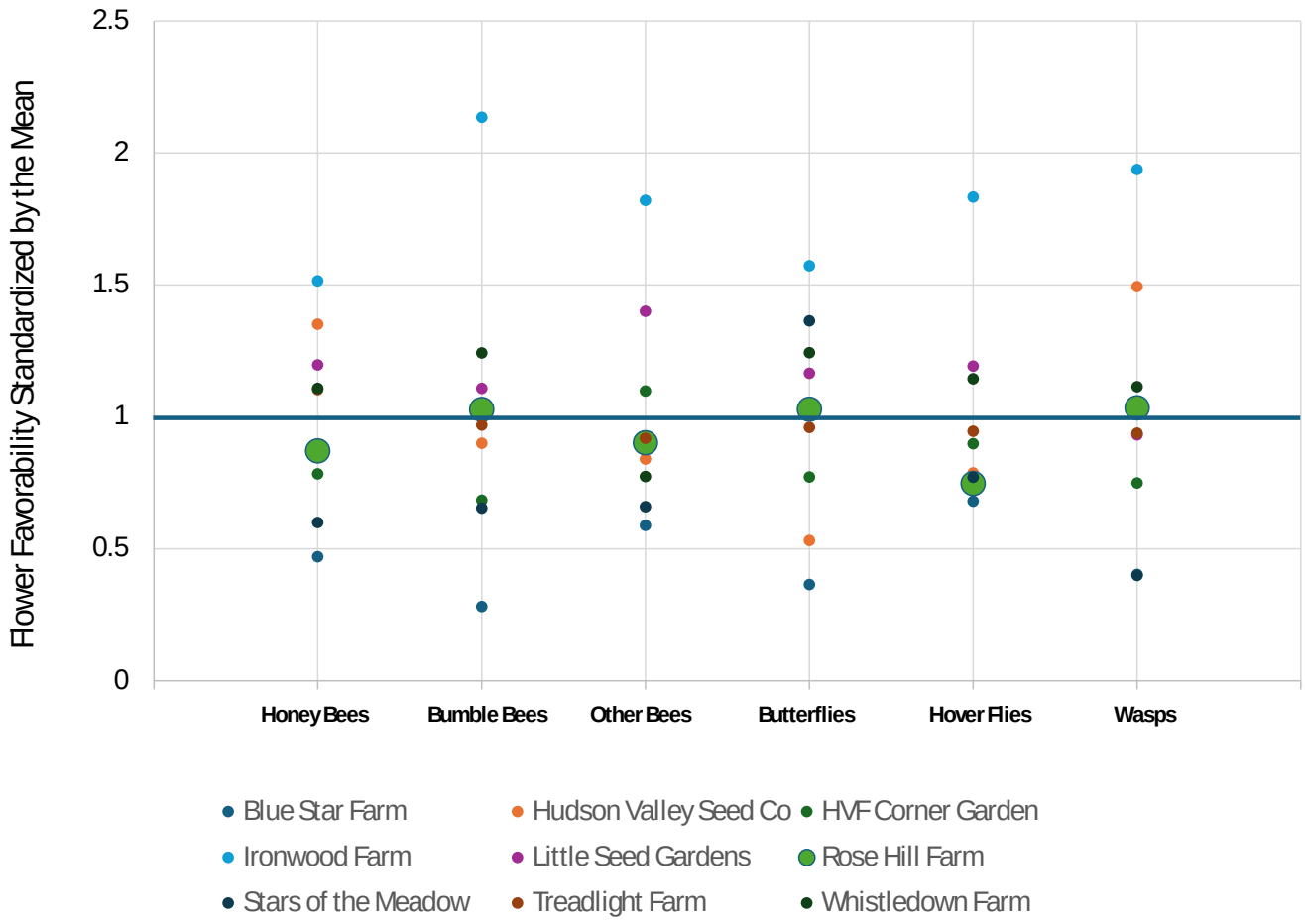


Figure 10. Standardized flower favorability scores by insect group. The solid line at one indicates the mean value across all farms.

Rose Hill has Honey Bee hives, perhaps to help with fruit-flower pollination. Rose Hill flower resources for Honey Bees appear to be roughly average (Fig. 10 and Fig. 9B), except for what look to be relatively low values in June (Fig. 9B). Assuming there weren't any fruit crop flowers demanding the Honey Bees' undivided attention, then trying to augment June Honey Bee flowers might be appropriate. The period of time after the spring flower flush and before the late summer revival can be a challenging season for pollinators.

Somewhat similarly, note that favored flower resources for 'other bees' (Fig. 9C) seem to be relatively sparse in June and July, although the situation looks better come late summer. Were one interested in promoting populations of 'other bees', then one might again refer to Table 1, and now search for early flowering, other-bee favored flower species. Indeed, broadly speaking the availability of favored flowers in June looks to be low for most insect groups, and this observation might encourage the planting of a range of early-flowering species.

One potential example of a field whose offering could be augmented is the westernmost unit of the northern study area. It was in 'mature cover crop' at the end of July and, other than

supporting a relatively high density of wasp-favorable flowers (Fig. 9D) during that month, it seemed to provide relatively few resources. Of course, it may well be that that field is in rotation for some future use and not really available for tweaking, but, if not otherwise claimed, then it might be a space where flower seeding could increase that unit's contribution to supporting flower visitors.

Potential Next Steps

Rose Hills fruit production is dependent on the flower pollination of those crops. Getting a deeper understanding of who was pollinating what at Rose Hill might help us better understand the potential relevance of flower management – which bees are needed for pollination and which flowers do they seem to favor when not visiting fruit flowers?

Control of some fruit pests is helped by 'native enemies' such as aphid-consuming hover fly maggots and those parasitoid wasps whose hosts include apple pests. Again, knowing which of these are active on the Rose Hill crops and which flowers favor them could be useful, although, admittedly, understanding the flower preferences of tiny parasitoid wasps is difficult.

Finally, these insects are surely using a broader landscape than what was included in our survey, and doing some at least cursory explorations for early-season, or even early summer, flowers might reveal other regions of the farm which are important to these creatures.

Acknowledgments

Many thanks to Kevin Clark for his support and interest in our work.

Appendix: List of Flowering Plants Observed.

On the following three pages, you find the appendix with the list of plants seen in bloom in the survey units of Rose Hill Farm during three surveys in 2025. The column annotations are explained below.

Native: Indicates whether a species is considered native to the Hudson Valley, "Y" or not, "N." Non-native invasive species are denoted "N-I." Wild-growing species have only the entry "Y," "N," or "N-I." Cultivated species have an added "cult." Additional entries in parentheses indicate that a usually wild-growing plant is occasionally cultivated, "(cult)," or a usually cultivated plant is occasionally also found wild, "(wild)."

Rarity: A star * in this column flags species we consider rare or uncommon in the Hudson Valley.

Ubiquity: The values are calculated as the average % of survey units at the farm which contained the species in bloom during the months of its flowering season.

Duration: The number of months (1 to 3) in which the species was observed in bloom at the farm.

Fl. Season: Indicates with an "x" the months in which the species was observed in bloom at the farm.

Appendix: List of Plants Found in Bloom at the Study Units of Rose Hill Farm During Three Surveys in 2025

			Rarity	Ubiquity	Duration	Fl. Season		
Common Name by Groups	***Scientific Name***	**Native**	**regionally rare/uncommon**	**avg. % of units during flowering season**	**# months in bloom (of 3)**	**June**	**July**	**Aug/Sep**
agalinis, small-flowered	*Agalinis paupercula*	Y	*	5.0	1			x
alfalfa	*Medicago sativa*	N cult		5.0	1			x
arugala	*Eruca sativa*	N cult		5.3	1	x		
aster, awl	*Symphyotrichum pilosum*	Y		35.0	1			x
aster, calico	*Symphyotrichum lateriflorum*	Y		35.0	1			x
aster, lance-leaved	*Symphyotrichum lanceolatum var. lanceolatum*	Y		20.0	1			x
aster, New England	*Symphyotrichum novae-*	Y		10.0	1			x
aster, purple-stemmed	*Symphyotrichum puniceum var. puniceum*	Y		20.0	1			x
aster, willow-leaved	*Symphyotrichum praealtum var. praealtum*	Y	*	5.0	1			x
avens, white	*Geum canadense*	Y		5.3	1	x		
beardtongue, foxglove	*Penstemon digitalis*	Y cult (wild)		5.3	1	x		
bedstraw, hedge (wild madder)	*Galium mollugo*	N		29.0	3	x	x	x
bedstraw, Labrador	*Galium cf. labradoricum*	Y		5.3	1	x		
beggar-ticks, devil's	*Bidens frondosa*	Y		10.0	1			x
beggar-ticks, purple-stemmed	*Bidens connata*	Y		5.0	1			x
bindweed, field	*Convolvulus arvensis*	N-I		7.8	2	x	x	
bindweed, hedge	*Calystegia sepium*	N		30.0	2		x	x
blue-eyed-grass, mountain	*Sisyrinchium montanum var. montanum*	Y		5.3	1	x		
blue-eyed-grass, narrow-leaved	*Sisyrinchium angustifolium*	Y	*	5.3	1	x		
boneset, common	*Eupatorium perfoliatum*	Y		5.0	2		x	x
buckwheat	*Fagopyrum esculentum*	N cult (wild)		10.1	3	x	x	x
bugleweed, American	*Lycopus americanus*	Y		7.5	2		x	x
burdock	*Arctium sp.*	N		5.0	1		x	
butter-and-eggs	*Linaria vulgaris*	N		11.8	3	x	x	x
buttercup, tall	*Ranunculus acris*	N		26.1	2	x	x	
campion, bladder	*Silene vulgaris*	N (cult)		15.4	3	x	x	x
carrot, wild	*Daucus carota*	N		65.0	2		x	x
chamomile, corn	*Anthemis arvensis*	N		7.8	2	x	x	
chickweed, mouse-eared	*Cerastium fontanum ssp. vulgare*	N		18.9	3	x	x	x
chicory	*Cichorium intybus*	N		25.0	2		x	x
clover, alsike	*Trifolium hybridum*	N		5.1	3	x	x	x
clover, large hop	*Trifolium aureum*	N		10.5	1	x		
clover, red	*Trifolium pratense*	N (cult)		69.5	3	x	x	x
clover, white	*Trifolium repens*	N		42.5	3	x	x	x
cosmos, garden (white, pink, red)	*Cosmos bipinnata*	N cult		5.0	1			x
daisy, oxeye	*Leucanthemum vulgare*	N		15.7	2	x	x	
dandelion, common	*Taraxacum officinale*	N		36.1	2	x		x
dewberry, northern	*Rubus flagellaris*	Y		5.3	1	x		
dock, broad-leaved	*Rumex obtusifolius ssp. obtusifolius*	N		5.0	1		x	
dock, curly	*Rumex crispus ssp. crispus*	N		5.1	2	x	x	
dogwood, gray	*Cornus racemosa*	Y		10.5	1	x		
dogwood, silky	*Cornus amomum ssp. amomum*	Y		10.5	1	x		
enchanter's nightshade, common	*Circaea canadensis*	Y		10.0	1		x	

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			Rarity	Ubiquity	Duration	Fl. Season		
Common Name by Groups	***Scientific Name***	**Native**	**regionally rare/uncommon**	**avg. % of units during flowering season**	**# months in bloom (of 3)**	**June**	**July**	**Aug/Sep**
fleabane, daisy	*Erigeron annuus*	Y		50.8	3	x	x	x
fleabane, Philadelphia	*Erigeron philadelphicus var. philadelphicus*	Y		26.3	1	x		
garlic-mustard	*Alliaria petiolata*	N-I		5.3	1	x		
goldenrod, early	*Solidago juncea*	Y		17.5	2		x	x
goldenrod, flat-topped	*Euthamia graminifolia*	Y		12.5	2		x	x
goldenrod, smooth	*Solidago gigantea*	Y		10.0	2		x	x
goldenrod, tall	*Solidago altissima ssp.*	Y		35.0	1			x
goldenrod, wrinkle-leaved	*Solidago rugosa var. rugosa*	Y		25.0	1			x
ground-cherry, clammy	*Physalis heterophylla*	Y	*	5.0	1		x	
ground-ivy	*Glechoma hederacea*	N-I		10.3	2	x		x
hawkweed, meadow	*Pilosella caespitosa*	N		5.1	2	x		x
hawkweed, orange	*Pilosella aurantiaca*	N		5.3	1	x		
heal-all	*Prunella vulgaris*	U		47.5	2		x	x
horse-nettle	*Solanum carolinense var. carolinense*	Y		20.4	3	x	x	x
horseweed	*Erigeron canadensis var. canadensis*	Y		12.5	2		x	x
Indian-hemp	*Apocynum cannabinum*	Y		23.0	2	x	x	
Indian-tobacco	*Lobelia inflata*	Y		10.0	1		x	
ironweed, New York	*Vernonia noveboracensis*	Y (cult)		10.0	2		x	x
jewelweed, spotted	*Impatiens capensis*	Y		20.0	2		x	x
Joe-Pye-weed, spotted	*Eutrochium maculatum var. maculatum*	Y		12.5	2		x	x
kale, broccoli, etc. (white or ye fl)	*Brassica oleracea (all*	N cult		5.3	1	x		
knapweed, spotted	*Centaurea stoebe ssp. micranthos*	N-I		20.0	2		x	x
knotweed, common	*Polygonum aviculare*	N		5.0	1			x
ladies'-tresses, southern slender	*Spiranthes lacera var. gracilis*	Y	*	5.0	1			x
lady's-thumb	*Persicaria maculosa*	N		10.2	3	x	x	x
lamb's-quarters	*Chenopodium album*	N		5.0	1			x
lobelia, spiked	*Lobelia spicata var. spicata*	Y	*	5.3	1	x		
loosestrife, purple	*Lythrum salicaria*	N-I		30.0	2		x	x
milkweed, common	*Asclepias syriaca*	Y		21.1	1	x		
milkweed, swamp	*Asclepias incarnata ssp. incarnata*	Y		10.0	1		x	
mint	*Mentha sp.*	U		5.0	1		x	
moneywort	*Lysimachia nummularia*	N		5.3	1	x		
monkeyflower, square-stemmed	*Mimulus ringens*	Y		5.0	1		x	
mountain-mint, Virginia	*Pycnanthemum virginianum*	Y (cult)	*	12.5	2		x	x
mugwort	*Artemisia vulgaris var. vulgaris*	N-I		10.0	1			x
mullein, common	*Verbascum thapsus*	N		5.0	1		x	
mustard, field	*Brassica rapa*	N		7.5	2		x	x
orchid, northern tubercled	*Platanthera flava var. herbiola*	Y	*	5.3	1	x		
pink, Deptford	*Dianthus armeria*	N		5.3	1	x		
plantain, common	*Plantago major*	N		17.5	2		x	x
plantain, narrow-leaved	*Plantago lanceolata*	N		35.9	3	x	x	x
primrose, common evening	*Oenothera biennis*	Y		10.0	2		x	x
quickweed	*Galinsoga sp.*	N		5.0	2		x	x
ragweed, common	*Ambrosia artemisiifolia*	Y		40.0	1			x

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			Rarity	Ubiquity	Duration	Fl. Season		
Common Name by Groups	***Scientific Name***	**Native**	**regionally rare/uncommon**	**avg. % of units during flowering season**	**# months in bloom (of 3)**	**June**	**July**	**Aug/Sep**
rose, multiflora	*Rosa multiflora*	N-I		5.3	1	x		
rose, pasture	*Rosa carolina ssp. carolina*	Y		10.5	1	x		
rose, swamp	*Rosa palustris*	Y		5.1	2	x	x	
smartweed, dock-leaved	*Persicaria lapathifolia*	Y		5.0	2		x	x
smartweed, low	*Persicaria longiseta*	N		15.0	2		x	x
smartweed, Pennsylvania	*Persicaria pensylvanica*	Y		5.0	1			x
snakeroot, white	*Ageratina altissima var. altissima*	Y		5.0	1			x
sorrel, common yellow wood	*Oxalis stricta*	Y		40.9	3	x	x	x
sorrel, sheep	*Rumex acetosella ssp. pyrenaicus*	N		5.3	1	x		
spearmint	*Mentha spicata ssp. spicata*	N		5.0	1			x
speedwell, thymeleaf	*Veronica serpyllifolia ssp. serpyllifolia*	N		5.3	1	x		
speedwell, water	*Veronica anagallis-aquatica*	N		5.1	2	x	x	
St. John's-wort, common	*Hypericum perforatum ssp. perforatum*	N		15.0	1		x	
St. John's-wort, dwarf	*Hypericum mutilum ssp. mutilum*	Y		5.0	1		x	
stargrass, yellow	*Hypoxis hirsuta*	Y	*	11.8	3	x	x	x
stitchwort, common	*Stellaria graminea*	N		5.3	1	x		
sunflower, common	*Helianthus annuus*	N cult		10.0	1			x
Susan, black-eyed	*Rudbeckia hirta*	N cult (wild)		25.8	2	x	x	
tearthumb, arrow-leaved	*Persicaria sagittata*	Y		10.0	2		x	x
thistle, Canada	*Cirsium arvense*	N-I		11.8	3	x	x	x
tomatillo	*Physalis philadelphica*	N		5.0	1		x	
trefoil, bird's foot	*Lotus corniculatus*	N		10.3	3	x	x	x
turtlehead, white	*Chelone glabra*	Y		5.0	1			x
vervain, blue	*Verbena hastata*	Y		5.0	1		x	
vervain, white	*Verbena urticifolia*	Y		10.0	1		x	
vetch, tufted or hairy	*Vicia cracca/villosa*	N		5.3	1	x		
water-plantain	*Alisma sp.*	Y		5.0	1		x	
yarrow, common	*Achillea millefolium*	Y (cult)		8.6	3	x	x	x
zinnia, garden	*Zinnia sp.*	N cult		10.0	2		x	x