



Improving Pest Management with Farmscaping

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Farmscaping is a holistic ecologically-based approach to pest management that emphasizes the arrangement or configuration of plants that promote biological pest management by attracting and sustaining beneficial organisms. Ideal farmscape

plantings provide habitat for beneficial insects, suppress weeds, and grow in close proximity to the cash crop without competing for light, water and nutrients. Research has shown that maintaining high levels of species diversity is a key characteristic of a proper functioning agroecosystem. Unfortunately, intensive farming operations including growing large monocultures, regular cultivation, and excessive use of insecticides often leads to a dramatic reduction in arthropod diversity, especially natural enemies that often keep many pest insects below damaging levels. Farmscaping is a technique designed to add diversity back to the



system and minimize disturbance leading to increases in natural enemy populations by providing insectary plants as food and shelter resources.

Successful conservation of natural enemies involves manipulation of the environment to favor natural enemies, either by eliminating adverse factors or by providing improved conditions for colonization and survival. In addition to acting as a reservoir for natural enemies, the use of farmscaping may increase alternative prey or insect hosts when other food resources are scarce. Farmscape plantings can also serve as an overwintering habitat for natural enemies to ensure carryover of beneficial insects from year to year.

Ideal plants for farmscaping

If the goal of farmscaping is to increase the numbers and health of natural enemies as well as to maintain them on your farm, then it is important to make the resources required by beneficial insects



readily available whenever they are needed. Examples include plants with flowers that provide ample nectar and pollen production, plants that sustain beneficial insect populations until they are needed, and plants with flowers with rewards accessible to natural enemies, but not pests.

Choosing appropriate plants can be based on plant characteristics including floral attraction, nectar accessibility and nutritional suitability allowing for the identification of plants that meet the needs of beneficial insects, while at the same time reduce the risk of pest outbreaks. Most beneficial insects feed on nectar and pollen at some point in their life, so these two characteristics are essential considerations in farmscaping. Studies have found that



floral area, peak bloom, flower height, and decreasing corolla width are the most important characteristics in attracting natural enemies; however, they are also the most important in attracting herbivores as well. Many plants in the carrot family (*Apiaceae*) make exceptional farmscaping plants because they contain exposed floral nectaries. In addition, many plants in the legume family

(*Fabaceae*) contain extra floral nectaries, which are nectar glands not associated with the flower, make resources highly accessible. Different plant families provide these resources in different ways, and some, such as buckwheat, have become staples in farmscapes. It is important when thinking about farmscaping to try to choose plants that will provide multiple benefits, such as increasing soil fertility, providing beneficial resources, and suppressing weeds.

Buckwheat. Although numerous plant species can serve as pollen and nectar sources for natural enemies, buckwheat (*Fagopyrum esculentum*) has been touted as an ideal farmscaping plant, because it provides abundant, easily accessible nectar, has extra-floral

nectaries, a long bloom time, suppresses weed growth, is inexpensive, and is easy to manage. In addition, no major crops are closely related to buckwheat and thus it should not attract or harbor additional pests. Buckwheat has been widely used as a companion planting in agriculture to supply nectar and pollen and encourage arthropod natural enemy populations. Nevertheless, because little is known about the nectar availability requirements for specific natural enemies it is a good idea to plant a mix of flowering plants from various plant families to ensure that resources are available to the target beneficials at the right time. This is the idea behind the commercially-available multiple plant species seed mixes that work well in attacking a wide range of beneficial insects. Numerous organic gardening periodicals have published comprehensive lists of plants recommended for farmscaping such as Rodale's Successful Organic Gardening™ Companion Planting, Rodale Press, 1994. We listed some of the most popular companion plants in Table 1.



Why should I farmscape?

While the primary goal of farmscaping is to improve pest management it is important to remember that farmscaping plants can add value beyond biological control, such and cut flowers and medicinal plants also have multiple uses. Additional reasons include:

1. *Work smarter, not harder.* Working with and using natural processes, like farmscaping, will help control pests sustainably, increasing farm productivity with less direct intervention thus minimizing labor inputs.
2. *Increased profits.* Farmscaping lowers the production costs of crops by encouraging and using natural enemies to suppress pests below threshold.
3. *It's cheap and easy!* You only need to farmscape about 5% of field area. Thus, for every acre, you need about 2200 square feet of flowering plants which costs between \$5.00 - 10.00.



4. *You can put farmscaping plants anywhere.* As long as the plants are near your cash crops, you can utilize otherwise unusable land such as drainage ditches and steep banks.
5. *Erosion control/soil building.* Farmscaping in places that are easily eroded gives stability to the soil and can be used as buffers, providing benefits to crops growing nearby.

References

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Table 1. Some flowering plants known to attract arthropod natural enemies.

Carrot Family (Apiaceae)		Legumes (Fabaceae)	
Anise	<i>Pimpinella anisum</i>	Alfalfa	<i>Medicago sativa</i>
Blue Lace	<i>Trachymene caerulea</i>	Big flower vetch	<i>Vicia grandiflora</i>
Caraway	<i>Carum caryi</i>	Fava bean	<i>Vicia fava</i>
Chervil	<i>Anthriscus cerefolium</i>	Hairy vetch	<i>Vicia villosa</i>
Coriander/Cilantro	<i>Coriandrum sativum</i>	Sweet clover	<i>Melilotus officinalis</i>
Dill	<i>Anethum graveolens</i>	Red clover	<i>Trifolium pratense</i>
Fennel	<i>Foeniculum vulgare</i>	White clover	<i>Trifolium repens</i>
Lovage	<i>Lovisticum officinale</i>	Cabbage Family (Brassicaceae)	
Bishops Lace	<i>Ammi majus</i>	Yellow rocket	<i>Barbarea vulgaris</i>
Wild Carrot	<i>Daucus carota</i>	Sweet Alyssum	<i>Lobularia maritime</i>
Aster Family (Asteraceae)		Candytuft	<i>Iberis umbellate</i>
Blazing Star	<i>Liatrus pycnostachya</i>	Mustards	<i>Brassica spp.</i>
Chamomile	<i>Anthemis nobilis</i>	Teasel Family (Dipsaceae)	
Cosmos	<i>Cosmos bipinnatus</i>	Cephalaria	<i>Cephalaria gigantea</i>
Coneflower	<i>Echinacea spp.</i>	Dipsacus	<i>Dipsacus spp.</i>
oreopsis	<i>Coreopsis spp.</i>	Pincushion Flower	<i>Scabiosa caucasicca</i>
Golden Marguerite	<i>Anthemis tinctoria</i>	Scabiosa	<i>Scabiosa atropurpurea</i>
Goldenrod	<i>Solidago altissima</i>	Mint Family (Lamiaceae)	
Marigold, Signet	<i>Tagetes tenuifolia</i>	Peppermint	<i>Mentha piperata</i>
Mexican Sunflower	<i>Tithonia tagetifolia</i>	Spearmint	<i>Mentha spicata</i>
Sunflower	<i>Helianthus spp.</i>	Thyme	<i>Thymus spp.</i>
Tansy	<i>Tanacetum vulgare</i>	Other Species	
Yarrow, milfoil	<i>Achillea millefolium</i>	Buckwheat	<i>Fagopyrum esculentum</i>
Yarrows	<i>Macrophylla taygetea</i>	Cinquefoil	<i>Potentilla spp.</i>