

Bring in the Bees: Farmscaping With Pollinator Mixes



By Genevieve Slocum and Dave Wilson, King's AgriSeeds

Why draw more insects to the field? Most row crop fields are acres upon acres of monoculture. If these crops are grown to bloom stage, they will provide food for vitally important pollinators for a very short time, and the single plant species creates food for limited insect species. **You can use mixes of flowering annuals (like our newly released Summer Solar Mix – a mix of cowpeas, buckwheat, sunflower, and sunn hemp) or perennials (mainly clovers) to create a living refuge on the farm with abundant sources of nectar and pollen.** This attracts diverse species of beneficial and predatory insects including: spiders, trichogramma (micro-wasps), minute pirate bugs, tachinid flies, lacewings, syrphid flies, ground beetles, stingless mini-wasps, big eyed bugs, praying mantises, honey bees, ladybugs, and butterflies. In addition, there are about 4,000 species of wild bees in the US that can be attracted by various blooming species. Both honeybees and wild bees are important agricultural pollinators. You'll also see an increase in bird species in the area that will feast on the bugs that are attracted to the pollinator planting. You'll raise your level of biological diversity across the whole spectrum from the soil to the air!

Although many farmers want to build organic matter, control erosion, and manage weeds with these flowering cover crops, others will use it primarily for attracting these beneficial species during the summer month. Others may combine this purpose with letting it grow longer and later, preventing nutrient loss, or as a break crop to manage nematodes.

The end goal of farmscaping is pollinator conservation on a field-level scale, which ultimately results in food security and bio-control of harmful crop pests. Most commonly used are blends of flowering commercial cover crops, but permanent native wildflower strips are also used quite effectively.

Active pollinator conservation efforts are excellent defense measures against adverse environmental conditions. These include monocultures that limit nectar production and timing over vast acreages, and systemic pesticides that can have sublethal effects like reduced foraging and reproduction.

Implementation

There is no one right way to start farmscaping, but as a general rule, the larger the area, the better. At least 1-2 acres of farmscaped area per 25 acres of cropland will give you the most benefit. Large, square blocks are the easiest to maintain in terms of edging, weed maintenance, or planting around the edges.

In reality, many configurations will work and what you choose depends on your management, field layout, and topography. Long corridor strips between fields may be the most practical layout.

Most farms have odd-shaped parcels of land that are not easy to bring equipment into for planting and harvest, and these make good areas to dedicate permanently to pollinator crops. These may include small, awkward wedges between a field and a portion of the creek or woods, waterways, hedgerows, diversion strips, farmed terraces, and other fragile areas that are best left alone for the duration of the season and perhaps permanently. Long contour strips could also be taken out of production and planted to a summer annual mix like Summer Solar Mix. They could be more permanently devoted to pollinator plantings or rotated with other crops. In a rotational practice, strips of these cover crops will provide a “break-crop” effect for the soil as well as build tilth and soil health with the active carbon organic matter added to the soil by the diverse cover crop root systems. It will also build soil fertility with both nutrient cycling by the grasses and forbs and nitrogen fixation by the legumes in the mix. Blooming summer annuals like these will be important for filling in both the early and late summer time periods of reduced floral resources. In the Summer Solar Mix, buckwheat will be the earliest flowering crop, with the cowpeas and sunflower being intermediate and later, followed by the sunn hemp very late in the season.

This practice is also well-suited to produce operations, since pollinator plantings can be rotated in alternate succession with the vegetable rows each season. Pest control in vegetable growing practices can be improved by attracting diverse groups of beneficials, including many parasitic species, which are good for controlling pests in vegetable crops. These vegetable systems would also benefit from planting the mix around the perimeter of a greenhouse—both to reduce mowing needs and to draw beneficial insects to the crops planted inside.

Pasture for the Winged Foragers

Using both annual and perennial plantings will fill various bloom windows. Wait until peak bloom or leave strips that will be left to peak bloom. It's also important to minimize disturbance to long term

plantings whenever possible. Make pesticide-free permanent conservation areas a priority. **Focus pollinator conservation efforts on areas of the farm that are not often treated with insecticides or vulnerable to spray drift.**

Leaving long-term mixes of blooming species to provide bee pasture is a powerful form of environmental stewardship. Mix various clovers to get variety and consistent bloom, such as

- King's Premium Clover Blend – a mix of red and white clovers; 2-4 year bee pasture
- King's 3-Way Clover Blend – a mix of red, ladino white, and yellow blossom sweet clover (usually recommended only for cover crop, not forage); 1-2 year bee pasture
- Hubam Annual White Sweetclover – a high nectar producing white sweetclover; 1-year bee pasture. Hubam can be planted from early spring to July. With a summer planting, it will bloom until frost. Staggered sequential planting dates can be used to ensure continuous nectar flow throughout the summer and fall. However, later plantings are less successful with limited moisture.

Even a one-year break into bee pasture followed by a rotation back to cropping systems can bring IPM and soil health benefits into the field in subsequent crops.

Bringing in Bio-Control

In monoculture fields with limited bloom there are few food resources to support natural predatory controls, so pests such as moths and their lepidoptera offspring may begin to dominate the area.

Farmscaping draws beneficial predators into adjacent areas so they can begin to move into the field to prey on these pests.

Ground beetles are often generalist predators and prey on slugs, caterpillars, and grasshopper eggs. These beneficial visitors can be encouraged with “beetle banks” – border areas of unmowed grasses and other vegetation.

In addition to drawing predatory insects, cover crops may also host prey insects that will in turn attract more predatory insects to the field. Many of these predators can have varied diets and will switch prey preference as the rotation moves forward and cash crop pests become available.

However, most crops need enough time to flower to draw effectively large beneficial insect populations. Buckwheat needs to flower for at least 20 days to build up solid populations. This poses a risk of reseeding, since buckwheat starts to set seed 7-10 days after flowering starts. To avoid this problem, you can leave solid seeded alternating strips of buckwheat growing interspersed with rows where the buckwheat is transitioned on time into the next crop. Reseeding is also only a potential concern in the same season – some buckwheat seeds that are set will stay viable the following year, but buckwheat is really not a tenacious weed, it can be killed easily with herbicides in conventional systems or cultivated out in organic cropping systems.

If the crop is being grown as green manure, it's commonly tilled in in the vegetative stage or early bloom stage. In this situation, it can be left to flower a few days before tilling in, but can still be terminated before seed set.

Grass cover crops – such as small grains, ryegrasses, and perennial grasses – usually produce no nectar and not as much pollen as broadleaves (forbs like buckwheat or any legume). However, grown in a mix, these two types combine well. The flowering broadleaf species can attract insects, while the grasses perform many of the other cover crop functions that may be needed, such as nutrient scavenging and soil building with their fibrous root system.

Some mixes are planted at the borders or intercropped, not to draw beneficial predators but as a “trap crop” - to draw harmful pests out of the main crop. This should be a separate species that can provide an alternate host and reservoir for the pest. Also, these trap crops that support low levels of pests can provide an additional food source for beneficial insects. They may first elevate the populations of harmful insects, but the populations of predators will likely spike soon after in response.

Some common pollinator crops and their side benefits –

- Clover – can double as a palatable and protein rich forage. This includes **Hubam Annual White Sweetclover**, with higher nectar production than most other clovers. Its abundant blossoms produce nectar flow from morning through late afternoon, while it also builds soil fertility by fixing nitrogen.
- Brassicas – also a potent biofumigant that naturally controls nematodes (break crop)
- Cowpeas – in addition to the floral nectar production, cowpeas have extrafloral nectaries – nectar producing glands at the base of the leaf stem.
- Buckwheat – grows faster than many summer annual weeds and forms a dense, shading, weed-suppressing canopy with its broadleaves. Buckwheat also produces root exudates that help liberate phosphorous that is tied up in organic compounds in the soil, which make the phosphorous available for crop plant utilization.

Gotta have diversity

Mixes are more useful than straight stands in almost every way, but not least because they both provide bio-diversity and support it. By expanding plant species diversity just a little bit, we can greatly increase insect diversity. **More species of insects means more natural checks and balances in the insect population, so no one species can predominate.** This is the epitome of successful Integrated Pest Management (IPM) – and reduces the chances that a single species can decimate a crop. If a variety of blooming species can be incorporated, the combined effect of different bloom times will lengthen the overall bloom period.

In a straight cover crop stand, there will be only a short bloom period, which creates a feast-or-famine situation for bees. Mixing different species helps mitigate this shortage-vs-abundance spike.

While most common blooming cover crops are excellent for growing beneficial insect populations, native plants and wildflowers take permanent pollinator strips to the next level, and have been proven to attract more abundant and diverse pollinator groups.

Be a biodiversity steward with fewer chemicals

Reducing insecticide use is a surefire way to boost beneficial insect populations. The stronger your IPM

program – using break crops, trap crops, pollinators, soil building crops, and longer rotations – the less need you have for chemical control. It is a positive feedback loop, a situation that can only feed on itself for the better.

Avoid applying insecticides to flowering plants. Use chemicals with low residual times that do not accumulate in plants or soil. Systemic insecticides such as neonicotinoids have persistent chemical residues in soil and plant matter. These residues can persist for years and be reabsorbed later by crops that were not treated. Cover crops must be protected from insecticide drift.

Pollinator plantings also make great buffers and transitional zones to soften the edge between two different environments. For example, planting corn or soybeans right up to the edge of a wooded area won't be the best plan since the field edges will get shading from the trees and be vulnerable to wildlife living in the forest. A pollinator mix planted at the woodline eases this sharp transition and also helps draw beneficial insects out of the woods and into the field.

Summer Solar Mix is convenient in many rotations and scenarios. Consider the following request from a Western New York farmer:

“We are looking at possible cover crops to plant after the spring peas are harvested mid to late June prior to seeding winter wheat. Last year we had the opportunity to grow a crop of BMR sorghum sudan for a dairy operation after the peas (19.5 green chop tons per acre). Looking for other options if that opportunity is not available again. Do you have any suggestions?”

Summer Panel Mix fits well in this particular situation as both a rapid soil builder and insect bio-diversity builder. It is appropriate here to plan it into the normal rotation for temporary farmscaping rather than placing it in a specially sanctioned area. Both can be done on the same farm, however.

This plan will be different on every farm, and each farmer is likely to know best where these plantings will offer the best fit and benefit to surrounding fields. The most important thing is to first have an understanding of the wealth of potential benefits, and the desire to take advantage of them.