

## Case Study: Integrating Pollinator Habitat into Dryland Fields

Doug and Anna Crabtree of Vilicus Farms have already integrated huge, expansive wildflower buffers between their production fields. Yet, if you ask, they will tell you they are just getting started. Farming more than 1,500 acres of dryland organic field crops in northern Montana, Doug and Anna have a goal of integrating pollinator conservation areas across their entire operation.

While many of the Crabtrees's more than 15 crops, such as black emmer and einkorn wheat, do not require insect pollination, others like flax, safflower, and sunflower benefit greatly from wild bee visitation. In addition to supporting pollinators, the Crabtrees are also interested in other benefits the buffer habitat can provide, including attracting insects involved in natural pest control, reducing wind velocity for adjacent seedling crops, reducing overland surface water and sediment runoff, and capturing wind-blown weed seed before it can settle in production fields.

While the Crabtrees's wildflower buffers are clearly paying dividends today, early in the design and establishment phase there were a number of questions about just how to get high-quality native wildflower habitat established using only organic methods. Covered with crested wheatgrass, an introduced plant known for its competitive ability and hardiness in cold, dry landscapes, the field borders certainly posed a site preparation challenge. Without herbicides as an option to remove existing weeds, the Crabtrees worked with Xerces staff to design a series of replicated tillage trials to understand which cultivation strategies would be most successful at suppressing future re-growth by the crested wheatgrass and provide a clean seedbed with minimal weed competition for the native wildflowers. The trials included the use of a wide chisel plow to open up bare ground swaths between fields that could be re-seeded into, as well as the use of deep moldboard plowing to invert the entire sod layer in other field borders to create a totally barren, grass-free surface.

Planting into a non-irrigated landscape averaging less than 12" of precipitation annually, we looked to include the most drought-adapted western native species for which we could find seed sources. The seed mix included resilient perennial wildflowers such as Lewis flax, blanketflower, Maximilian sunflower, yarrow, and scarlet globemallow, as well as annual wildflowers like plains coreopsis and wild sunflower to provide immediate resources for beneficial insects and rapidly cover the soil to prevent erosion. Low-stature native cool and warm season grasses were also included, to buffer against weed invasion. The seeds were planted in late spring, immediately after plowing, and just before the area typically receives most of its rain.

With little to no re-growth by the crested wheatgrass, fast, prolific growth by the newly-established native plants, and increased pollinator activity, the field borders, particularly the borders created using the moldboard plow, have been a success so far. Complementing these wildflower areas, the Crabtrees are using extensive multi-species, flowering, cover crop rotations that build soil organic matter, disrupt pest and disease cycles, and help create corridors for beneficial species to move throughout the farm. As ecosystem-based farmers, Doug and Anna are committed to farming land that provides its own pollinators, its own pest control, and its own nutrient cycling.



A bumble bee visits a phacelia blossom in a wildflower buffer at Vilicus Farms, northern Montana. (Photograph by Jennifer Hopwood, The Xerces Society.)



Wildflower buffer supports pollinators and beneficial insects adjacent to organic crops. (Photograph by Jennifer Hopwood, The Xerces Society.)

Doug Crabtree of Vilicus Farms standing in his sunflower crop field. Sunflowers benefit from wild bee visitation, which is boosted by the Crabtree's pollinator field borders. (Photograph by Jennifer Hopwood, The Xerces Society.)

