United States Department of Agriculture
Natural Resources Conservation Service

Plants Enhancement Activity – *PLT08 – Habitat Development for Beneficial Insects for Pest Management*

Enhancement Description
Establishment of habitat to attract and support populations of beneficial insects that provide natural suppress of undesirable insects or other pests. Beneficial insects used for pest management include insect arthropod, predators and parasitoids. Habitat requirements include shelter and food that attract and support beneficial insects. These can include trap crops and insectary strips (both permanent and annual.)

Land Use Applicability
This enhancement is applicable on cropland including orchards and vineyards.

Benefits

Environmental benefits will be operation specific. Benefits may include but are not limited to improved water quality through a reduction in the amount and type of pesticides used, reduced risk of chemical residue on farm products and less exposure of farm worker to pesticides. Increase in habitat for beneficial organisms will also provide food and shelter for pollinators and other wildlife species creating a more biologically diverse farm.

Criteria for *Establishing Beneficial Organism Habitat*

Planning Criteria
(Should be based on information available through the state land grant university or other known reputable sources such as "Appropriate Technology Transfer for Rural Areas (ATTRA)

- Identify pest species and associated beneficial insects targeted for control
- Inventory existing conditions on the farm to determine habitat needs of selected beneficial, include:
  - Permanent Insectary sites
  - Augmentation of existing hedgerows, field borders or other odd areas adjacent to fields
  - Trap crop areas
- Plant selection matched to attract identified beneficial insect
- Amount of habitat required based on the beneficial insect dispersal ability and can be either annual or perennial cover.
- Lists of plants suitable for beneficial insect habitat will be developed by NRCS at the state level. The lists must emphasize as many native species as practical.

Planting Criteria

- Site selection should consider existing weed pressures and available methods of control, delay planting if weed pressure requires excessive treatment.
- Site preparation and plant establishment shall be accomplished according to the appropriate NRCS conservation practice and specifications.
- Successful establishment is determined by comparing field conditions with published plant density recommendations for the species for the region.

Operation and Maintenance

- Management and/or maintenance activities such as mowing, haying, burning, or grazing must be conducted outside of the growing season or bloom period. Maintenance should be done on less then 1/3 of the acreage during any given year.
- Insecticides and herbicides should not be used in the habitat planting area. Even non-synthetic herbicides and botanical insecticides can harm beneficial insects. If adjacent crop areas are treated use one or more of the following actions to limit insecticides in the pollinator habitat area:
- Create insecticide free buffers in the first 25 feet of crop area,
- Use application methods that minimize drift to the adjacent habitat,
- The planted habitat areas must be regularly inspected for invasive and/or noxious plants or other plants that may compromise the purpose of this enhancement. Undesirable species should be controlled using the method least damaging method.
- If habitat is part of an organic farming operation, only materials allowed according to the USDA National Organic Program's National List of Allowed and Prohibited Substances may be used.

Documentation Requirements

Written plan documenting

- Targeted pest with associated beneficial insects
- A map showing the location and dimension of the beneficial habitat areas.
- A list of beneficial insect habitat species planted.
- List of maintenance activities carried out

TENNESSEE SUPPLEMENTAL INFORMATION FOR THIS ENHANCEMENT
PLT08 – *Habitat Development for Beneficial Insects for Pest Management*

Step 1, Target Pest and Associated Beneficial Insects: For specific information on beneficial insects, target insects controlled, and plants for attracting beneficial insects refer to the ATTRA publication *FarmScaping to Enhance Biological Control*; http://www.attra.org/attra-pub/farmscape.html Appendix B

Step 2, Select Beneficial Insect and Plant Species in the following table
PLANT SPECIES TO FORMULATE MIXTURES

Mixtures should be designed to provide blooming plants attractive to predacious insects that would feed on pest insects in the cash crop. The table below provides common flowering plant materials used in integrated pest management. **Mixtures should consist of at least 1-2 plant species for each blooming period (Spring, Summer, Fall) within the cropping season of the target crop. Plantings should consist of a diversity of plants with at least 2-3 species in the mix.**

Plant Species (A or P)	Peak Bloom Period	Seeding Rate* Lb/Ac	Seeding Date	Common Beneficial Insects	Trap Crop (Y or N)
Alfalfa (P)	May	7 – 20	CS fall or spring	Damsel bug, minute pirate bug	Y – (Cotton/strawberry; plant bugs)
Buckwheat (A)	21 day after planting	35	WS	Braconid wasp, hover flies, tachinid flies, lacewings, ladybug, chalcid wasp, minute pirate bug	Y – (Truck Crops; aphids)
Butterfly weed (P)	July	2	WS	Ladybug	
Clover, white (P)	June	1-2	CS fall or spring	Aphid parasites, braconid wasp, ground beetle, chalcid wasp	
Clover, crimson (A)	May	15 - 20	CS fall or sping	Ladybug, minute pirate bug	
Clover, berseem (A)	June	15 - 20	CS sping	Big eyed bug	
Coreopsis, lanceleaf (P)	July		WS	Lacewing, ladybug, hover fly, white fly parasite wasp	
Corn (A)	July	13 - 100	WS	Minute pirate bug, lacewing	Y – (Tobacco; earworm)
Cowpea (A)	July	75	WS	Braconid wasp, chalcid wasp	Y – (Soybean; stinkbugs)
Goldenrod, Rigid (P)	September	One half pound	WS	Damsel bug, lacewing, ladybug, minute pirate bug, spined soldier bug, tachinid fly, white fly parasite wasp	
Goldenrod, showy (P)	September	One quarter pound	WS	Damsel bug, lacewing, ladybug, minute pirate bug, spined soldier bug, tachinid fly, white fly parasite wasp	
Rye, cereal (A)	May	30 to 100	CS fall or spring	Ladybug	Y – (Soybeans; stinkbugs)
Sorghum, grain (A)		10 to 30	WS		Y – (Cotton; earworm)
Sunflower, Ashy (P)	August	2	WS	Braconid wasp,damsel bug, lacewing, ladybug, minute pirate bug, spined soldier bug, hover fly, white fly wasp	
Sunflower, Maximilian (P)	August	1	WS	Braconid wasp,damsel bug, lacewing, ladybug, minute pirate bug, spined soldier bug, hover fly, white fly wasp	
Sunflower, native (P)	August	10	WS	Braconid wasp,damsel bug, lacewing, ladybug, minute pirate bug, spined soldier bug, hover fly, white fly wasp	
Vetch, hairy (A)	May	7 to 20	CS fall or sping	Braconid wasp, minute pirate bug, chalcid wasp	
Yarrow, common (P)	July	2	WS	Braconid wasp, chalcid wasp, damsel bug, ladybug, minute pirate bug, spined soldier bug, hover fly, white fly wasp	

TRUCK CROP PLANTINGS					
Dill (A)	June	3 to 10	WS	Aphid midge, Aphid parasites, Braconid wasp, lacewing, ladybug, spider, spider mite destroyer, hover flies, tachinid fly, chalcid wasp, white fly wasp	
Mustard (A)	April	1 to 5	CS fall	Aphid midge, Aphid parasites, Braconid wasp, spider mite destroyer	
Caraway (A)	June	3 to 8	CS spring	Aphid parasites, spiders, hover flies, chalcid wasp	
Parsley (A)	June	10 to 30	CS spring	Aphid parasites, Braconid wasp, hover flies, tachinid fly	
Marigold (A)	August	4 to 12	WS	Parasitic nematodes, hover flies	
Cosmos (A)	August	2	WS	Ladybug, minute pirate bug, praying mantis, spider, hover flies, chalcid wasp, white fly wasp	
Chrysanthemum (P)	September	3 to 6	WS	Parasitic nematode	
Castor bean (A)	July	6 to 8	WS	Parasitic nematode	Y – (Cotton; bud worm)

* A = Annual, P = Perennial. Pure planting (monoculture) seeding rate. Mixture rates should be adjusted based on the number of species in the mix. For example, if two species are to be planted in a mix, the seeding rate should be 50% of the above listed rate for each species. Use higher seeding rates for production crops and where erosion is a threat.

GROWING SEASON OR BLOOM PERIOD – NO DISTURBANCE IS ALLOWED
GROWING SEASON APRIL 1 - OCTOBER 1
BLOOM PERIOD 30 DAYS PRIOR TO 30 DAYS AFTER THE BLOOM MONTHS OF THE CHOSEN MIXTURE

Step 3, Complete the following table

Producer Name:	Date:
Tract Number:	County:

Field Number	Planned Habitat Acres	Planned Mixture (list species)	Planned Habitat Type					Primary Target Pest	Primary Target Beneficial Insect
			Existing Field Border (Y or N)	Existing Hedgerow (Y or N)	Permanent habitat (Y or N)	Existing Crop odd area (Y or N)	Trap crop area * (Y or N)		

* Trap Crop is a plant species designed to lure a pest insect away from the crop plant needing protection rather than attracting predatory insects. All other habitat types in this enhancement are designed to provide habitat for predacious insects that will otherwise control pest insects.

Beneficial Insects for Pest Management References

ATTRA publication *FarmScaping to Enhance Biological Control*; http://www.attra.org/attra-pub/farmscape.html

For specific information on beneficial insects (Arthropods) and their prey, refer to UT Extension publication W127 *Common Beneficial Arthropods Found in Field Crops*:
http://www.utextension.utk.edu/publications/wfiles/W127.pdf

If habitat is part of an organic farming operation, only materials allowed according to the USDA National Organic Program's National List of Allowed and Prohibited Substances may be used. Refer to:
http://www.ams.usda.gov/AMSv1.0/ams.fetchTemplateData.do?template=TemplateN&navID=NationalListLinkNOPNationalOrganicProgramHome&rightNav1=NationalListLinkNOPNationalOrganicProgramHome&topNav=&leftNav=&page=NOPNationalList&resultType=7acct=nopgeninfo