

Plant Enhancement Activity – PLT20 –High residue cover crop or mixtures of high residue cover crops for weed suppression and soil health



Enhancement Description

Utilize biomass from a cover crop or cover crop mixture as a living or killed mulch to suppress weed seed germination and to add carbon to the terrestrial carbon pool.

Land Use Applicability

Cropland

Benefits

Cover crop or cover crop mixtures when managed properly can physically and/or chemically control weeds. Physically, a live cover crop competes with weeds for water, nutrients and sunlight. A killed cover crop physically prevents the germination of weed seed by changing the micro environment around the weed seed (temperature and light). Chemically, certain legume, cereal or brassica cover crops suppress weed seed germination and seedling development via plant-produced natural herbicides upon decomposition (i.e., allelopathy). By implementing this enhancement, the major resource concerns of soil quality, soil erosion, plants and water quality will be improved and maintained to a high level.

Conditions Where Enhancement Applies

This enhancement applies to all acres of annually planted cropland. These acres can be organic, transitioning to organic, or non-organic.

Criteria

1. Between each crop in the rotation, except double cropped situations, seed a high residue cover crop or mixture of high residue cover crops. Each cover crop or mixture shall meet the following requirements:
 - a. Seed a cover crop or cover crop mixture at a rate and within a planting date range as determined or agreed to by the NRCS State Agronomist.
 - b. Cereal grain cover crops or mixtures shall be top dressed with nitrogen at rates determined or agreed to by the NRCS State Agronomist.
 - c. The cover crop or mixture shall reach a maturity level (i.e., growth stage) to ensure 100% soil coverage in the row middles for 3 months of the growing season. For example, cereal rye shall reach the soft dough stage before termination. The NRCS State Agronomist can determine a specified maturity level or desired residue quantity (dry matter basis) for the selected cover crop cultivar.
 - d. Termination of all cover crops shall be accomplished by chemical methods, non-chemical methods (such as flail mowing or roller crimper), or a combination of both.



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2. The crop rotation must be grown in a manner to maintain a minimum Soil Tillage Intensity Rating (STIR) ≤ 10 as determined by RUSLE2.

Adoption Requirements

This enhancement is considered adopted when all of the criteria have been met on the land use acre.

Documentation Requirements

Written documentation for each year of this enhancement describing the following items:

1. Cover crop or mixture used
2. Cover crop or mixture seeding rate and seeding date
3. If applicable, nitrogen top dress rate and date for the cover crop or mixture
4. Cover crop or mixture termination stage
5. Method used to terminate cover crop or mixture and date of termination

References

Price, A.J., K.S. Balkcom, L.M. Duzy and J.A. Keltron. 2012. Herbicide and Cover Crop Residue Integration for *Amaranthus* Control in Conservation Agriculture Cotton and Implications for Resistance Management. Weed Technology. In press.

Price, A.J., K.S. Balkcom, R.L. Raper, C.D. Monks, R.M. Barentine, and K.V. Iversen. 2008. Controlling Glyphosate-Resistant Pigweed in Conservation Tillage Cotton Systems. Conservation Systems Research. Special Publication No. 09. USDA-ARS-NSDL, Auburn, AL.

Sustainable Agriculture Research and Education (SARE). 2010. Managing Cover Crops Profitably. 3rd ed. Handbook #9. College Park, MD.

PLANT ENHANCEMENT ACTIVITY

PLT20 – OR High residue cover crop or mixtures of high residue cover crops for weed suppression and soil health

Taken from *Using Cover Crops in Oregon*, EM8704, Oregon State University Extension Service, October 1998:

Growing seasonal cover crops during the non-crop production periods of the rotation improves soil health by improving soil structure. And healthy soil structure favors root growth, and water storage and infiltration functions. Roots promote soil aggregation, residue additions stimulate activity by microbes, and organic matter additions provide nutrients to subsequent crops. Cover crops also provide soil protection during critical erosion periods.

Cover crops suppress weed growth by competing with weeds for light and nutrients and sometimes releasing toxic substances into the soil. Cereals, grasses, and crucifers that establish quickly in the fall suppress slower growing fall and winter weeds. The rapid spring growth of most cover crops is ideal for spring weed suppression. In addition, winter-killed, herbicide-killed, or mown cover crops can form mulch that smothers weeds. Cover crops in Oregon are not typically fertilized, and are generally utilized to scavenge nutrients.

Prior to selection of this enhancement, you should determine if a cover crop is appropriate for your area. Several areas in Oregon do not receive enough precipitation to make cover cropping feasible. Read over the cited references for precipitation requirements or contact the NRCS State Agronomist for more information.

Approved cover crops and cover crop mixes for weed suppression and soil health improvement include those found in *Using Cover Crops in Oregon, EM8704, OSU Extension, 1998* (distributed previously to all field offices), *Managing Cover Crops Profitably, 3rd Edition, USDA-SARE 2007* (available on the State Office shared drive), and the *Oregon and Washington Seeding Guide*, available at :
http://www.or.nrcs.usda.gov/technical/ecs/plants/general_info.html.

To maintain or improve soil organic matter, cover species should be selected on the basis of producing high volumes of organic material and or root mass to maintain or improve soil organic matter. Use the NRCS Soil Conditioning Index (SCI) in RUSLE2 to document a positive trend in the system with the use of cover crops. The cover crop should be terminated as late as feasible to maximize plant biomass production, considering the time needed to prepare the field for planting the next crop and soil moisture depletion.

To suppress weeds cover crop species should be selected for their chemical or physical characteristics to suppress or compete with weeds. Cover crops residues should be left on the soil surface to maximize allelopathic (chemical) and mulching (physical) effects. For long-term weed suppression, reseeding annuals and/or biennial species can be used.