

## Winter Cover Crops Help Maintain Soil Structure by Insulating

Winter cover crops that reclaim lost plant nutrients, provide organic matter, and prevent erosion can also play an important role in maintaining granular soil structure, the U.S. Department of Agriculture says.

Soil-management specialists at USDA's Agricultural Research Center, Beltsville, Md., have found that cover crops planted early in the fall insulate the soil and prevent damage to soil structure by repeated freezing and

thawing. Recommended cover crops include rye and other cereals, rye grass, annual bromegrass, vetch, and crimson clover. They may be used singly or in combination, depending on local conditions.

Although repeated freezing and thawing during the winter may improve soil by breaking up clods, these forces are frequently detrimental to soil-aggregate structure (clustering of fine soil particles) under certain field con-

ditions. The researchers point out that the protective insulation provided by vegetation reduces the number of times a soil freezes during the winter and the depth to which frost penetrates. Cover crops also promote and help to maintain large populations of earthworms and other earth-boring organisms, which increase infiltration and speed up drainage of excess water from the surface soil.

Laboratory and field tests at

Beltsville indicate that breakdown of soil aggregates is a major problem at wet soils where freezing and thawing takes place several times during the winter months. This is a particularly common occurrence in the Middle Atlantic States.

Freezing and thawing on unprotected fields causes slumping of the soil granules when they become wet. This condition leads to surface puddling, followed by crusting and cracking as the soil dries out in the spring

In other trials conducted by USDA researchers, different methods of tillage and replacement of crop residues resulting in varying rates of soil deterioration in corn plots formerly in sod.

Corn was grown each year with a winter cover crop of rye or vetch. Tillage variations included plowing, plow-depth tillage with sweeps, and a mulch-till "once-over" planter. Residues were chopped and disked and either turned under or left on the surface.



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