RESEARCH UPDATE

(Continued from Page 20)

tually eliminate agricultural non-point pollution by surface runoff from cropland.

• Add organic matter. Cover crops as well as manure or crop residue add organic matter to the soil. Increased organic matter improves soil tilth and productivity. At one time the prairie soils contained about 12 percent organic matter. After 100 years of crop production, the average organic matter content is now less than 6 percent. This is still high compared to most of our soils, so any increase in organic matter is going to be of even greater benefit to us.

• Improve soil structure and tilth. Organic matter may act as a cement to glue soil together as aggregates. Also, the breakdown of plant residues by soil microbes produce gums that glue larger aggregates together into peds. This results in greater soil permeability, aeration, and ease of crop emergence and root growth which is improved tilth. A soil of good tilth is easy to till and produce a seedbed or plant with a no-till planter if you're planting no-till.

• Fix atmospheric nitrogen. Any legume has the ability to fix nitrogen from the atmosphere. The nitrogen is incorporated into the plant as protein and legumes are inherently high in protein. Stem, leaf, and root residues left in the field from legumes are higher in nitrogen content than winter rye or grasses and the breakdown of legume plant residues commonly releases some of this nitrogen back into the soil for use by the next and succeeding crops. Corn or small grains that require external sources of nitrogen benefit from nitrogen released by a previous legume crop or cover crop.

• Recycle unused soil nutrients. Unused soil nitrogen left over at the end of the growing season will tend to leach out during the fall, winter, and spring and may end up in the groundwater. Cover crops, whether legume or grass, will use some of this nitrogen if they can grow after uptake by the primary crop slows or stops. These cover crops need to be adapted to relatively cool fall or spring conditions to be effective in removing unused nitrogen from the soil. Some of this nitrogen is ultimately recycled for use by future crops as the cover crop residues are broken down by soil microbes.-

• Increase soil productivity. All of the above improve the soil productivity. If we are going to be able to feed an ever-increasing population, productivity is going to have to increase, not decrease. It is going to become necessary in the future to farm marginal soils whose productivity is already low. It is these soils that will benefit most from cover crops but cover crop use on better soils will also reverse the downward trend in productivity as a result of organic matter, nutrient, and soil loss.

• Weed control. The presence of winter annual or living mulches will help control escape weeds and may prevent or slow down the invasion of new weeds that might otherwise become a problem. Cover crops provide competition against weeds just as crops do. The cover crops must be managed so they don't compete with the primary crop however. Competition from the cover crop is generally not a problem the year of establishment if the cover crop and main crop are planted at the same time. There is generally no competition against weeds either, so weeds must be controlled with herbicides. In succeeding years, after the cover crop is well established, it must be rendered non-competitive by severe suppression until the primary crop is well established (about the first six weeks) and as a result weeds emerging during this period are not controlled either. Herbicides are presently being used for both cover crop suppression and weed control during the first six weeks after crop planting.

Crownvetch/ Birdsfoot Trefoil Demonstration Fields

• Establishment in corn. Crownvetch and birdsfoot trefoil seedling survival is probably better in corn than any other crop because corn doesn't produce as dense a shade as soybeans or small grains. The herbicide choice is, however, rather limited.

At the moment, the safest and probably the best method of establishment is to use Pursuit with imidazolinone resistant (IR) corn hybrids.

(Turn to Page 22)

CORN TALK NEWS
PENNSYLVANIA MASTER CORN GROWERS ASSOC., INC.