Cultural Perspectives

To Cover Crop or Not to Cover Crop - That is the question

Bareroot nursery managers have been on the horns of a dilemma for some time. They know that they need to rotate their crops and have observed increased soil tilth after crop rotation, but cover crops and green manure crops have a couple of drawbacks:

1. They may actually cause a decrease in soil organic matter levels due to the "primer" effect in which decomposing organisms build up populations on the cover crop and then go on to breakdown resident organic matter.

2. Some crops, notably legumes, stimulate populations of fungal soil pathogens. This was not a problem when we had methyl bromide fumigants will be a serious one if/when they are gone.

Well, the plot thickens. A couple of recent studies have shown that cover crops can decrease the leaching of nitrate-nitrogen, and so may help reduce groundwater pollution. Both studies found that leaving land fallow, even just over the winter, contributes to the leaching of nitrates. Tests in lettuce fields in the Saunas valley of California show that soil nitrate levels often double during the winter fallow season when nitrogen mineralization reaches its annual maximum. The average nitrate content in the root zone under six different cover crops was found to be lower than the bare soil control during January (grey bar) and much lower after the cover crops were incorporated (black bar) ***(Figure 1)***. This decrease was due to two factors. Obviously, the cover crops reduced teachable nitrates by organically fixing it into their biomass, but the researchers also found that soil moisture was significantly lower in the cover crop plots. As for the possibility of soil pathogen activity, no damping-off due to Pythium spp. or Rhizoctonia spp. was observed in the study plots.

Should you use cover or green manure crops? It's a complicated questions and you'll just have to look at the big picture and consider all possible effects. Hey, nobody said it was going to be easy!!!

Sources:

Gouin, F. 1992. Fallow land contributes to nitrate pollution. Free State Nursery News 5(3)

Jackson, L.E.; Wyland, L.J.; Klein, J.A.; Smith, R.F.; Chaney, W.E.; Koike, S.T. 1993. Winter cover crops can decrease soil nitrate, leaching potential. California Agriculture 47(5): 12-15.

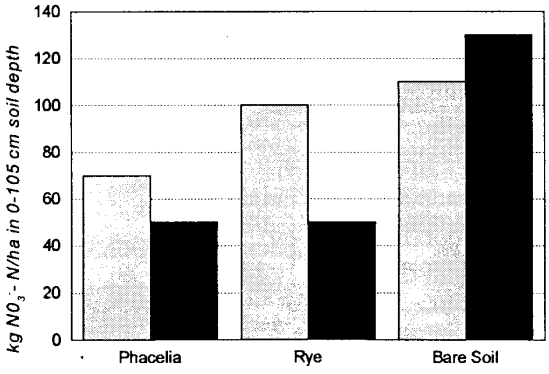

Figure 1.

Nitrate (NO_3 - N) leaching was less under two cover crops than in bare fallow.