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Inside this Issue

Cover Crop Mixes for Soil Health.....page 1

Designing a Pollinator Seed Mix.....page 2

Staff News.....page 2

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Cover Crop Mixes for Soil Health

Annie Young-Mathews

(above): **John Knox**, PMC Biological Technician, harvests samples prior to cover crop termination.

The Corvallis PMC is currently in the first year of a 3-year national study looking at the effects of different cover crop mixes and seeding rates on soil health. Similar studies are being carried out at PMCs in CA, WA, MO, ND, MD, and FL. The results from this study will help inform local recommendations for effective cover crop mixes and seeding rates to control weeds and add organic matter, N, and biological activity to depleted soils.

The three mixes being tested are crimson clover-cereal rye, crimson clover-cereal rye-hairy vetch-forage radish, and crimson clover-cereal rye-hairy vetch-forage radish-oats-forage turnip, as well as a non-cover cropped control. Each mix was seeded at three different rates: 20, 40 and 60 seeds per square foot.

We seeded the cover crops in early October after the first rains and terminated them 6 months later in early May by rolling and then spraying them prior to no-till seeding sweet corn in early June. By the time the cover crop was rolled down, most plots had formed an impressive jungle of vegetation nearly 5 feet tall and covered in flowers attracting bees and other insects.

The brassicas (radish and turnip) were quick to germinate and grow in the fall, out-competing the usual annual winter weeds, and their broad leaves helped provide 95% cover by 60 days after planting (DAP), while the 2-species mix had 85% cover, and the control had only 65% cover at 60 DAP.

Cover crop biomass production averaged 9,060 lbs/acre for all three mixes, versus only 4,340 lbs/acre for non cover cropped (weedy) plots. Biomass from the 4– and 6–species mixes contributed an average of 206 pounds N per acre to the soil for the subsequent corn crop, while the 2-species mix contributed only an average of 121 lbs N/acre.

We are still waiting for soil testing lab results, but there are dramatic differences in the growth of the corn planted into the different treatments, suggesting substantial improvements in soil health already after only one year of cover cropping. Plots that had 40 or 60 seeds per square foot of the 4– and 6-species mixes have tall healthy corn with dark green leaves, while the control, 20 seeds/ft^2, and 2-species mixes show varying degrees of stunting and yellowing.

Stay tuned for more updates on this study as we move forward with our second no-till cover crop planting this fall!

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(above): Meadow checkermallow, rosy plectritis, and riverbank lupine flowering in the early-blooming pollinator mix at the Corvallis PMC in May 2013.

Designing a Pollinator Seed Mix

Kathy Pendergrass

Invertebrate predators, parasitoids, and native pollinators provide useful pest control and pollination services on farms. These beneficial insects can all benefit from on-farm pollen and nectar sources such as hedgerows, field or road edges, or meadows planted with a diverse mix of flowering native plants. Below are some tips on designing and installing a pollinator seeding that were covered at the 5th Annual Farmscaping with Native Plants Field Day on June 18, 2013 at the Corvallis PMC.

Determine suitable (and available) species for your pollinator seeding:

- "Right plant for the right place". Choose plants that do well with the soil moisture and amount of sun/shade that will be available at the planned seeding site.
- Be sure to include a range of plants that will bloom throughout the entire growing season.
- Include flowers of different colors and shapes.
- Purchase seed stocks that originated from within the project ecoregion (or from an equivalent climatic regime).
- Consider pests of adjacent crops and compatibility with adjacent land uses. For example, will a particular rose family species harbor pests for an adjacent rose family crop? If there is a potential for livestock to graze a site, make sure that none of your plants are poisonous to livestock.

Calculate your seeding rates:

Determine the desired seeding rates for each of the species included in a seed mix based on size of seed and known establishment rates for the species (as much as possible). Determine the bulk seeding rates needed and the total seed needed to purchase (seed calculators can be used to easily determine these):

Pure Live Seed (PLS) = (% pure seed) x (germination) ÷ 100

Bulk seeding rate lbs/ac = PLS rate lbs per acre ÷ % PLS (expressed as decimal)

General rules of thumb for seeding:

- 30-60 PLS per square foot
- Seeding depth generally not more than ¼-inch (many species require light to germinate)
- If the species has seed dormancy mechanisms, you may overcome these by fall planting

Increase (double) your seeding rates if:

- Slope is greater than ~40%,
- Hydroseeding,
- Broadcasting seed (instead of drilling),
- Site is weedy/poor site preparation (but it's always better to do good site preparation prior to seeding).

Staff News

Corvallis PMC Says Good-bye to Long Time Farm Foreman

Our best wishes to Kevin Robb in his new position as Farm Manager of the Oregon State University, Crop and Soil Science Department's Hyslop Field Laboratory. He is now working just next door to the PMC at "Hyslop Farm" where he used to work as a mechanic prior to coming to the Center. Kevin served with considerable expertise as farm foreman for the PMC from June 2005 until June 2013. His duties included principal equipment operator, pesticide applicator, and facility maintenance man. Kevin also worked closely with the PMC Manager to improve farming practices, obtain new, innovative farm equipment, and upgrade buildings. Good luck to Kevin in his new endeavors!