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Hoolehua PMC News

Helping People Help the Land

UNDERSTANDING INOCULANTS

TROPIC SUN sunn hemp cover crop field

Nitrogen is the most abundant gas in the atmosphere. Although it is one of the vitally important nutrients that plants require for healthy growth, it is unusable to plants in its gaseous state. Therefore, almost all plants depend on some outside source of nitrogen to survive. On the other hand, plants of the legume family are able to produce, or fix, their own nitrogen. Legumes accomplish this through a symbiotic relationship with *Rhizobium* bacteria that are naturally found in the soil. In this mutually beneficial relationship, legumes provide an ideal environment for *Rhizobium* growth and in return *Rhizobium* bacteria convert atmospheric-nitrogen into a mineral form that can be utilized by the host plant. When *Rhizobium* bacteria are taken in by legumes, they form nodules on the plant's roots. These nodules are the nitrogen-fixing factories. Through this relationship, legumes are able to convert atmospheric-nitrogen into 50-200 lb/ac of "plant-useable" nitrogen depending on the legume species and the amount of *Rhizobium* bacteria in the soil. A producer can assure a sufficient amount of *Rhizobium* bacteria is present in the soil by adding inoculants to seed prior to sowing.

Inoculants are various species or strains of commercially prepared *Rhizobium* bacteria. It is very important to know that the symbiotic relationship between legume plants and *Rhizobium* bacteria are species specific. Although most *Rhizobium* bacteria will work with most legumes, each legume species should be inoculated with a specific *Rhizobium* bacteria species or strain if optimum nitrogen production is desired. While naturally occurring *Rhizobia* are commonly found at very low levels in the soil, it is recommended that commercial pure inoculants be applied to legume seed before planting to assure adequate amounts of the most effective *Rhizobium* bacteria are present. There are many different companies that offer inoculants and they will all have virtually the same *Rhizobium* bacteria species for the various species of legumes. The producer should follow the manufacturer's recommendations regarding the strain of *Rhizobium* bacteria and the amount to be added to the legume seed.

Nodules along the main stem of TROPIC SUN sunn hemp root

The USDA is an equal opportunity employer and provider.

Rhizobium Species for Legumes

***Bradyrhizobium japonicum* (Soybean)**	
Glycine max	soybean
***Rhizobium leguminosarum* (Pea/Vetch)**	
Vicia benghalensis	purple vetch
Vicia sativa	common vetch
Vicia villosa	wooly-pod vetch
***Sinorhizobium meliloti* (Alfalfa/Clover)**	
Medicago sativa	alfalfa
Melilotus officinalis	sweet clover
***Rhizobium sp.* (Cowpea)**	
Arachis glabrata	rhizoma peanut
Arachis pintoi	pinto peanut
Cajanus cajan	pigeon pea
Crotalaria juncea	sunn hemp
Desmodium heterophyllum	variable-leaf ticktrefoil
Desmodium incanum	Spanish clover
Desmodium intortum	green-leaf ticktrefoil
Desmodium triflorum	3-flowered beggarweed
Vigna radiate	mung bean
Vigna marina	beach vigna
Vigna unguiculata	cowpea
***Rhizobium sp.* (Lotus)**	
Lotus pedunculatus	big trefoil
Rhizobium trifolii	
Trifolium repens	white clover

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Cover Crop Training

By Cynthia Shishido

Front Row: Amy Koch, Laura Nelson, Nicola Giardina, Kara Nelson, Jenni Scotti, Jason Hew, Kylie Wong, Jenna Dunn, Kori Hisashima, Hannah Conley
Back row: Alex Wong, Morgan Pua'a, Spencer Nagata, Jacky Vega-Perez, Kahana Stone, Bernadette Luncsford, Kalani Matsumura, Alex Gerken, Kanoe Malani, Jill Ficke-Beaton, Wallace Jennings, Laila Jayyousi, Matthew Wung, Andres "JB" Juario, Bernard Matatumua-Vermeulen, Ranae Ganske-Cerizo, Adam Reid, Stephanie Mick, Carolyn Wong, David "Kawika" Duvauchelle, Keni Reyes

In late January, 24 planners, comprised of 14 NRCS and 10 district employees, gathered at the Plant Materials Center (PMC) in Hoolehua, Moloka'i for the PIA Cover Crop Training.

Acting PMC Manager, David Duvauchelle gave an informative lecture on the PMC's establishment, Mission and its' new focus on working closer with the field offices. Guest speaker, Dr. Koon-Hui Wang of the University of Hawaii discussed the benefits of cover crops and the Plant Available Nitrogen (PAN) Calculator while Soil Scientists Amy Koch and Jackie Vega-Perez paired up to present an introductory course on Soil Health 101–Current Status and Future Directions and later in the field, covered Cover Crop Benefits to Soil. Later in the afternoon, State Agronomist/Water Quality Specialist Adam Reed discussed Cover Crop Planning Considerations.

Special thanks to the PMC Staff (Kawika Duvauchelle, Keni Reyes and JB Juario) for setting up and breaking down the conference room and the picnic area where we enjoyed our brown bag lunches, to Wally Jennings for bringing a whole array of sandwich-makings to share, Dr. Koon-Hui Wang for sharing her expertise and everyone else who participated!

For more photos and the Presentation PowerPoints, check out the PIA SharePoint.