

Green Manure

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Green manure is not manure at all but is just a cover crop that has been grown just to dig it into the soil to add organic matter and improve the soil quality. Green manure is grown to benefit the soil, rather than as food or beauty. Hondo Iris Farm's Chris Camacho recommended (during his presentation "Companion Planting for Irises" presented to the 2012 AIS Region 23 Convention at Roswell, NM) to plant sweet peas in between the irises in the spring time. I like the idea of growing a pretty cover crop in between the irises. The sweet peas will die during the heat of the summer but you can just work it into the soil or cut it off at ground level and add it to your compost pile. Leguminous green manures such as beans, alfalfa, clover, lupines and sweet peas contain nitrogen-fixing symbiotic bacteria called rhizobium in root nodules that fix atmospheric nitrogen in a form that plants can use. The bacteria can hang around for a few years after tilling the legumes but subsequent plantings will increase the rhizobium. The root nodules return the Nitrogen (N) into the soil as the roots compose. This often makes them the preferred source of green manure material. Hmm... I may have to let the clover that has been invading my iris garden live instead of pulling it out. Flowering clover can be attractive to pollinators and beneficial insects.

Organic websites talk about using an inoculant that you use to coat the legumes seeds to help the legumes work. The inoculant contains in powder form rhizobium bacteria that you can add to the soil. Inoculants are available at garden centers in a powder form, and is advertized to greatly improve the fixating of N into the soil. However, the type to use seems to vary with the type of cover crop. Jeff Anderson, agricultural extension agent with the Dona Ana Cooperative Extension Service of New Mexico State University, emailed me that planting Sweet Peas will not increase soil nitrogen if the soil does not have the right soil rhizobium inoculant, nor if the soil already has plenty of nitrogen. Plus he recommends working the sweet peas into the soil before they flower. So I think I need find the right inoculant for sweet peas. The costs seem to be \$10 for a half lb packet that can treat 50 pounds of seeds. I wasn't planning on planting that many sweet peas! To apply inoculant put the beans/peas in a bowl. Sprinkle liberally with powdered inoculant. Spray on a small amount of water. Shake container to coat seeds. Plant seeds.

Chuck Chapman, well know iris hybridizer, stated that you can find out for yourself if your soil has rhizobium bacteria. Plant some sweet peas. Dig up a plant after it has grown for a while. Look for the presence or absence of the nodules on the roots. Then you can buy some inoculant for the next crop if you don't see the nodules or there aren't many of the nodules.

Other types of green manure like Rye or Buckwheat, use an extensive root system to absorb and concentrate nutrients like potassium that may otherwise be unavailable to crops. Alfalfa cover crops are grown so their deep roots can breakup and loosen compacted soil. Their deep root system may bring up nutrient resources closer to the surface. Irises have fairly deep root systems so may not benefit as much from this type of cover crop as plants with shallower roots. Chapman suggested planting rye as a cover crop. Rye releases seed killing chemicals once it is tilled into the soil and is rotting. This reduces weeding. However, you need to wait about 6 weeks after tilling in to plant seeds of anything.

Most website's discussions on cover crops talk about planting in a field that has already been harvested and is just laying bare. We can raise cover crops on new beds prior to planting irises as was done at the Mystic Lake Gardens, Nuevo, CA at the 2012 AIS National conventions that contained the master plantings. They had planted a winter cover crop of barley and tilled it in before they planted the guest irises. Superstition Irises also plant a winter cover crop mixture of oats, wheat, barley and vetch (for nitrogen). However, most of irises in our beds won't be moved for a few years. Tilling in the cover crop into the soil around irises can risk damaging the roots. The next best thing may be to clip the cover crop at ground level and leave the roots and nodules to decompose in the soil (thus adding N) and just add the top part of the crop to the compost pile which you can then later add around the irises or with new plantings.



Figure 1 Mystic Lake Gardens grew a cover crop of barley before they planted the guest irises for the 2012 AIS National Convention in Ontario, CA

The abundance of soil microorganisms increases after you till in the cover crops into the soil. These microorganisms aid in the decomposition of the newly tilled in vegetation. The degradation of plant material by the microorganisms allows the nutrients held within the green manure to be released and made available to your irises. Many green manure crops aerate the soil by the ability of their root system to penetrate compact soil. The amount of humus found in the soil also increases with higher rates of decomposition, which is beneficial for the growth of the iris succeeding the green manure crop.

Other benefits of green manure crops are that it can crowd out weeds. Weeds have a harder time germinating under a dense growth of green manure crops. Weeds that germinate have root competition with the cover crop meaning the weeds will produce less seeds. You have to be careful not to use a cover crop that can go to seed and take over like Verbena or have extensive root systems that will crowd-out the irises like the Mexican Primroses. Many spring growing cover crops like sweet peas can't take our heat and many summer growing cover crops can't handle the winter.

Some sources say that the green manure controls and reduces insect pests by providing a habitat for predatory beneficial insects. It can also provide a habitat for native pollinators like bees as well. Scott Bundy (NMSU entomologist) (the guest speaker at the MVIS May 2012 meeting) talked about providing habitat for helpful insects and they can control the pests like aphids that love to come out and wink at the show judges just when they are examining our beautiful show stalk for a possible blue ribbon, or worse, for best in show.

Another benefit not listed in the iris literature but maybe important to our desert environment is that green manure crops shade the soil and may help the top section of the soil from being sterilized by our intense sunlight and prevent erosion by wind. Some places worry about erosion by rain, with us, its wind erosion. Some studies on desert grasslands have shown that wind can scour nutrients from grassland and deposit them around shrubs creating islands of fertility surrounded by bare soil. The grasslands then slowly convert to scrublands which severely impacts the amount of cattle that can range the land. I recently had to dig up a flower bed that had Mexican Primroses. The primroses were getting into the irises despite the presence of a physical barrier. The primroses had been there for 10 years and there wasn't a smidgeon of land that wasn't covered by the aggressive pink flowers. I noticed how much more worms the primrose bed had than the iris bed next to it where I had suppressed all weeds. The soil *looked* healthier. Unfortunately Mexican Primroses will crowd out anything so it had to be removed after invading my prized irises. So my plan is to try planting something of short stature in between the irises that won't compete too much. It doesn't necessarily have to be a cover crop in the traditional sense. It can be pansies in the winter and spring or Portulaca, Alyssum or daisies in the summer. I have used Portulaca (Moss Rose) before. It doesn't survive our winter, but it does self sow without providing too much competition for the irises. There are short varieties of sweet peas as well as mounding varieties that I may try.

Mulch always works to shade the soil. Rocks, wood mulch, straw, pine needles can be added around (but not on top of) the irises. Yet, a simple top-dressing of free aged manure might also accomplish the same benefit. Mystic Lake Gardens added wood shavings to their guest iris beds from a local horse ranch as a mulch to prevent moisture loss and control weeds. They said the mulch was very important due to the sandy soil and several months of summer temperatures over a hundred degrees. It sounds familiar.

Chris Camacho also recommended desert plants like the Nightshade. It's a weed! I can't get my mind around using Nightshade around my irises even if the seeds freely blow in constantly from my neighbor's yard. You can talk me into letting clover live, but not Nightshade. I'd rather try sweet peas. I will let you know how it goes.

References

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