

APPLICATION RATES -

Conventional Soybean Production-Program North Dakota, South Dakota, Minnesota

Following is some information pertaining to the control of soybean insects. Over and beyond the soil nutrition and the bio-insecticides (see attached material), the Dramm Liquid Fish and microbial packages are the inputs that I work with to aid in the suppression of the plant pathogens. On the foliar feeding of the soybeans, the two key stages that I have been proposing foliar feeding have been the R1 and R5-6 stages. This may vary on the level of infestation and the region of the

Key stages to evaluate for soybean fields for insect suppression programs

Preplant- With high infestations of bean leaf beetles in the southern part of the Valley, scout for beetles in the adjacent alfalfa fields. One must consider foliar spraying the alfalfa field to reduce the population

Liquid Starter- If bean leaf beetle are an early season problem, use suppression program in liquid starter

Foliar feeding- for the aphids and leaf hoppers and/or the beetle are at threshold consider this option.

Foliar for plant health, for suppressing insects and suppressing pathogens and viruses

The treated leaves will contain concentration of azadirachtin, the active ingredient in neem oil (Neem Blend 45 EM), for up to 15 days. You witness the chewing or sucking insects will then be reduced by up to 80% in 4-5 days. The neem oil is a growth regulator. The insects that do survive, generally, will not produce any young or mature. This includes the leaf hopper, alfalfa weevil, bean leaf beetle and aphids. From the good side, the beneficial insects are not eating the plant (herbivores) so they will not be affected by the insect suppressant.

Soybean Planting

Soybean Seed treatment The treatment of organic seed with Myco Seed Treatment.* These organisms are beneficial to protect the seed from pathogen fungi. Also, inoculate with Rhizobium bacteria to fix nitrogen.

Liquid Starter

the bioinsecticides can be added to the liquid starter.

8 oz	Neem Blend 45 EC *
3-5 gal	water may be added as needed for calibration
optional	Mycotrol O* (active ingredient is Beauveria bassiana- a fungi that infects insects)

Neem Blend 45 EC

According to Doug Murray, IPM Specialist, Paw Paw, Michigan, the application of the Karaneem EM' to the soil at planting will have excellent results to reduce the bean leaf beetle larva population. According to Murray, the systemic levels of the neem will be in the plant for up to two weeks. Any larva that eat on the root nodules or root hairs will ingest the bio-insecticide and suppression them. This insect suppression formula is also **very effectively on grubs, wire worms and cutworm.**

Mycotrol-O*

The addition of the Mycotrol-O to the starter program will inoculate the soil with additional beauverria bassiana, a fungi that attacks insects. The unique thing about the Mycotrol O is that it reproduces best in wet or moist conditions. I began using it in combination 6 years ago. The reason for adding it to my insect suppression program is that it is the first bio-insecticide that works better in wet conditions.

Foliar Feeding for Bean Leaf Beetle

Foliar OPTION 1- third trifoliage

Many growers have not had the insect pressure in the past to be proactive on the front end. Generally the first sign of insects is when the adult beetles begin feeding on the newly emerging soybeans. This is the prime time to suppress the advance of the beetles. Any larva that are feeding on the plant roots will pupate and emerge in July. It's at this time that quick action must be taken.

Foliar OPTION 2- R1-R3 stage

The emergence of the beetle and the flowering of the soybean plants are simultaneous over that two week period in mid to late July. Without suppression of the beetles both yield loss and bean quality will be a byproduct of the insect pressure.

Insect Suppression Proposed Foliar applications

Third Trifoliage

Proposed Formula-per acre application

2 qt	Dramm Fish (use to adjust tank mix ph to 5.8-6.4)
8-12 oz	Neem Blend 45 EC - (must have .05 -.25% in the formula)
2 qt	Bio Special
2 gal	Quaility Ag Foliar plus fulvic acid
2-18 gal	water-
optional	Mycotrol O *

The R1 stage- Foliar feeding is very beneficial because of the high demand for phosphorus. This will maintain or increase the brix levels at this time. The fish hydrolysate will improve the phosphorus demand because of the large amount of phosphorus in the foliar fish.

Proposed Formula-per acre application

2 qt	Dramm Fish (use to adjust tank mix ph to 5.8-6.4)
8-12 oz	Neem Blend 45 EC -(must have .05 -.25% in the formula)
2 qt	Bio Special
2 gal	Quaility Ag Fall Foliar plus fulvic acid
2-18 gal	water-

optional- soybean aphid control
adding 2-4 oz garlic oil to the formula will reduce the aphid populations as they are moving into the area. Because aphids and leafhoppers identify plants with UV censors, the garlic oil sprayed on plants will deflect the insects for up to two week

This mix must have a ph of **5.8-6.0** for maximum results. Lower ph will destroy the microbial life of the foliar spray and a higher ph will reduce the uptake of the foliar application in the plant.

Plant Stress at R1 stage through pod fill

Plant flowering requires large amounts of phosphorus, any plant phosphorus short fall in the plant will put the plant in stress, lower the brix. This generally is the time that the producers will also witness the buildup of the soybean aphids along with the bean leaf beetle. If the growers have used the liquid starter program (a program high in carbon including complex sugars), the aphids will generally be controlled until the later phases of plant development.

R5 to R6 stage At this stage, because of the demand of the potassium for the production of the fruit (seeds), the plant will go into stress and again the brix will fall and reduce plant health. The formula contains high levels of liquid calcium and potassium.

Additional foliar formula- FOLLOW ABOVE FORMULA. Make adjustments as necessary.

Pathogenic Suppression options

Add 2 oz CITREX/acre **note:add last to the tank mix**

Citrex is labeled in Europe for the suppression of white mold, Pythium, fusarium, veticillium, botrytis and other pathogens. It is an ascorbic acid base biofungicide. Go to www.CITREX.com for more details.

Myco Seed Treatment, Neem oil, Garlic Oil, Citrex and Mycotrol O are EPA registered bio-pesticides

These are formulas used by Reg Destree, organic grower and consultant, La Crosse, WI 608-785-2790

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