DEBUG TURBO
APPLICATION RECOMMENDATION FOR PECANS

General:

DEBUG TURBO is a neem based (containing about 67% Neem Extract with Azadirachtin, and 20% Synergist) insecticide, repellant, anti-feedant and growth regulator. We recommend the use of DEBUG TURBO by itself with no additional pesticides unless the insects reach economically damaging levels, in which case organic pesticides may be used in conjunction with DEBUG TURBO. Apply even if there is no insect problem, as a preventative.
DEBUG TURBO is soft on beneficials and pests do not develop resistance to it.

Water pH should be between 5.5-6.0. Use buffers if necessary
It is recommend that the application be made late in the evening and early morning to be most effective.

For the Control of: **Pecan Nut Case Bearer, Yellow Pecan Aphid, Black Margined Aphid, and Black Pecan Aphid, Ants, Mites, Wooley Bearers and Grass hopper nymphs**

APPLICATION RATES, DILUTION AND TIMINGS

(1) PECAN CASE BEARER (*Acrobasis nuxovorella)*

Pecan Case bearer is found throughout Pecan growing areas from Florida to New Mexico. The development of the pecan nutcase bearer like any biological organism responds to its thermal environment, which is especially critical to "cold blooded" insects because the surrounding environment dictates their internal temperatures. If the environmental temperature exceeds some upper limit or declines below some lower limit, growth and development are impaired or halted. However, when these organisms are exposed to temperatures within some optimal range, growth and development typically increase with temperature. Heat units or growing degree-days quantify an organism's thermal environment providing a daily estimate of the amount of contributory heat -- heat that will contribute to growth and development.

DAMAGE:
Pecan Nut Case bearer Larvae Damage Olive green caterpillars up to 1/2 inch long that feed on buds or in young shoots in early spring. Later in spring feed in young nuts usually entering near stem end --- Caterpillars feeding in small gray case during spring.

Damage is done primarily when buds and leaves are unfolding. Trees may be kept in defoliated condition for 3 to 4 weeks. Larvae found in summer feeding cases on underside of leaves from May to November --- Tiny, tough silken cases are attached to the leaves, twigs or branches, small brown worms, enclosed in these cases which they drag about them feed on the leaves, buds and fruits. It can attack Pecan, Pear, Apple and Cherries.

WHEN TO TREAT:

Treat before the temperature becomes too hot for development of the Pecan Case bearer or after cold season has ended. Nut case bearer sprays should be timed to control first generation larvae before they enter the nuts. Start treatment when first significant nut entry is expected. Scout for eggs on the small nuts after pollination. Controls should be applied 14 - 21 days after first male is captured in the traps. Early treatment will significantly reduce future generations of larve and adult infestation. Timing should be in May/June. Use the new phermone traps to monitor for adult nut case bearer's emergence and population density. Nut case bearer populations differ from orchard to orchard and year to year. Continue using DEBUG TURBO during the season if infestation persists.

TREATMENT:

Biological treatments are ideal. DEBUG TURBO is preferred to other biologicals, as the bearers cannot develop resistance to DEBUG TURBO. Give two preventative sprays of DEBUG TURBO at the rate of 1- 2 quarts per 100-150 gallons of water, at an interval of 10-12 days, during May-June and July-August period (if required). In applying DEBUG TURBO spray, all leaves, twigs, and nuts should be covered. Hydraulic machines are designed to use large volumes of water to carry the chemicals to the trees. Sprays should be applied until water runs off leaves in the upper portion of the tree. Do not attempt to concentrate or use low volume sprays with hydraulic equipment.

Air blast and mist blowers are designed for low volume applications. Air blast equipment should be adjusted before the spray season begins to deliver the desired volume of spray in the proper pattern as is dictated by tree size. Consult instruction manuals or spray machine representative for advice on correct placement of spray nozzles. Remember, when spraying with air blast sprayers, the Neem active ingredient is carried to the tree in a small volume of water, which is diluted, by a larger volume of air. Too fast a rate of travel will result in insufficient coverage, where the trees are not filled with spray-laden air resulting in poor coverage.

DEBUG TURBO applied at the right time will prevent build up of Pecan Nut Case Bearer. Along with AGRONEEM, It is suggested to plant a trap crop of peas around PECANS, to reduce the insect pests in the orchards.

(2) YELLOW APHID COMPLEX

Yellow pecan aphid (*Monelliopsis pecanis)*

Black margined aphid (*Monellia caryella*)

Both the yellow pecan aphid and the black margined aphid are somewhat similar in appearance and cause similar types of damage. Both species are yellow with black markings. The amount of black pigmentation varies with stage of development and time of year, but in general increases from spring to fall. The cornicles on both species are reduced to pores. Except for the winged adults, yellow pecan aphids have long setae, or hairs, that tend to stand out from the body at 45 to nearly 90-degree angles, giving the aphids a pincushion look. In addition, yellow pecan aphids have red eyes. Black margined aphids have much shorter setae than yellow pecan

aphids and the setae form less than a 45-degree angle with the body. There are multiple generations of both species each year; populations tend to peak in spring and again in fall.

DAMAGE:
Both species primarily feed on the underside of leaves. Black margined aphids feed on the underside of leaves on major leaflet veins while yellow pecan aphids feed on the network of small veins located throughout the leaf. They damage pecan trees by extracting large amounts of photosynthate and water from leaves, which impairs the growth of both shoots and roots. They also secrete large amounts of honeydew on to leaves, and the sooty mold that grows on the honeydew can reduce photosynthetic efficiency.

WHEN TO TREAT:

Prior to June 1: Treat if honeydew is accumulating. June 1 to August 15: Treat if the total number of aphids exceeds an average of 20 per leaf. August 15 to leaf fall: Treat if the total number of aphids exceeds an average of 10 per leaf.

TREATMENT:

Apply DEBUG TURBO at the rate of 1- 2 quarts per 100 gallons of water. Repeat after 7 – 10 days.

(3) BLACK PECAN APHID (*Melanocallis caryaefoliae)*

The black pecan aphid is the only black aphid that attacks pecan foliage. The adult may be various shades of green or black. Nymphs tend to be lighter in color than the adults, especially in spring when the first through fourth instars have little dark pigment. Antennae are pale yellow with small amounts of black on several segments. Eyes are dark red and cornicles are short. In the other two aphid species present on pecan, cornicles are absent or greatly reduced. Black pecan aphids have multiple generations each year beginning development in March and continuing into November. Populations generally peak in fall.

DAMAGE:

Black pecan aphid feeding causes bright yellow, angular, 0.4 square inch spots to develop on the leaves between the veins. The spots die and turn brown, and just a few such spots cause a leaflet to shed. Premature leaf drop results in poor nut quality and reduced bloom in subsequent seasons.

WHEN TO TREAT:

Usually control is not needed until late in the season, after mid-July. At that time, treat if levels exceed an average of one black aphid per compound leaf.

TREATMENT:

Apply DEBUG TURBO at the rate of 1- 2 quarts per 100 gallons of water. Repeat after 7-10 days.