UNIVERSITY OF HAWAI'I AT MĀNOA

College of Tropical Agriculture and Human Resources
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1200 Pennsylvania Ave., NW.
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Subject: **Docket ID Number EPA-HQ-OPP-2004-0348**
Comments in Response to *Malathion Reregistration Eligibility Decision; Notice of Availability*

The following comments are being submitted in response to the November 29, 20, 2006 *Federal Register* notice regarding EPA's Reregistration Decision for the pesticide malathion. These comments are being submitted on behalf of the Western Integrated Pest Management Center and provide input on the use of malathion in Hawai'i.

Malathion is used on a number of crops so it is difficult to characterize every scenario in which it may be used. It is a very inexpensive insecticide that is not a RUP so availability and use are widespread. It is effective on some species of aphids and on caterpillars, which are the main vegetable crop uses for the product in Hawai'i. Malathion is of particular importance to **papaya** producers, especially for the control of Stevens leafhopper, white peach scale, and possibly the papaya mealybug.

Limiting malathion to a maximum of four (4) application per year will cause significant hardships for **papaya** growers. Many of the papaya growers are immigrants from the Philippines who find it difficult or impossible to become certified pesticide applicators and, so, are not able to obtain a permit to purchase restricted pesticides. It is critical that unrestricted products such as malathion, with the ability to control a wide spectrum of insects be made available to the growers. Leafhopper and white peach scale have the potential to reduce production by 25 to 50 percent. This would cause significant economic hardship to papaya growers. It could even threaten the viability of papaya production in Hawai'i. Alternatives for papaya growers are imidacloprid and spinosad which are highly effective, but are very costly to purchase and apply and also are limited to a small number of applications per year.

There are concerns about some of the lengthened Restricted Entry Intervals (REIs). Growers of some **vegetable crops**, such as cucurbits, harvest on a daily basis for the duration of the harvest period. For **watercress**, and other crops, extending the REIs will make it difficult for workers to get to harvest sites if they have to access them through fields that are still under the REI. Since many crops in Hawai'i (in particular **vegetables**) are constantly being harvested and planted, and land, for the most part is limited,

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there are concerns about major logistical problems associated with having to hand harvest and work around areas that still may be under REI. Sequential plantings are placed side by side. Therefore, some procedures would require modifications--with, probably, associated costs--in order to accommodate the REI of a plot that could be right next to an area being harvested. If the proposed REIs are incorporated into malathion product labels, it may be difficult for many farmers to use the product at all and for the **watercress industry** that could be devastating since very few insecticide alternatives exist.

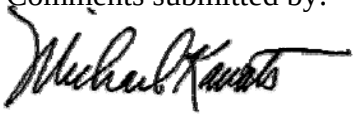
The **seed corn** industry in Hawai‘i is concerned with and opposed to the three (3)-day restricted entry interval for detasseling. At the time of pollination in corn nurseries and top cross/foundation seed production fields, malathion is used almost exclusively to control earworms that attack corn ears through the silk. It is at the time of silking when malathion is sprayed to control this pest. A three-day interval would not allow anyone into the field to complete the task of detasseling.

For **forage grasses and pasture and rangeland**, there is only one product available for the control of the yellow sugarcane aphid (YSA) in Hawai‘i. Malathion has been an important tool for the control of YSA in Hawaiian pastures and rangelands, since the discovery of the insect in the state in 1989. The only formulation available for control of YSA in pastures and rangelands in Hawai‘i is Clean Crop Malathion 57 EC. At current label rates of 0.9375 to 1.25 lb ai/A, malathion provides moderate control of YSA. Multiple applications per paddock per year may be required due to the multiple spikes per year observed in the YSA population dynamics. Even at 1.25 lb ai/A (the maximum single application rate for forage grasses and bermudagrass), control of YSA is not 100%. The maximum application rate of 0.9375 lb ai/A for pasture and rangeland is inadequate. Two (2) applications per year would be insufficient to control the YSA. Even more problematic, is the limitation to the ULV formulation for pasture and rangeland.

Macadamia nut growers have expressed concern that the maximum of two(s) applications per year could leave them without sufficient tools to deal with an invasion of introduced species.

Comments were contributed by extension staff of the College of Tropical Agriculture and Human Resources at the University of Hawai‘i, a representative of the Hawai‘i Farm Bureau Federation Environmental Stewardship Committee, a macadamia nut grower and a chemical vendor. Letters from the president of the Hawai‘i Papaya Industry Association and the Hawai‘i Crop Improvement Association are appended to these comments.

Comments submitted by:



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Detailed Comments on Labeling Changes in the Reregistration Eligibility Decision for Malathion: **Hawai‘i**

Crop: **Watercress**

Labeling change of concern: Maximum Number of Applications per Year

Watercress growers in Hawai‘i require eight (8) applications of malathion because there are very few chemical control products available for use on watercress

Labeling change of concern: Restricted Entry Interval (REI)

Watercress growers need a 12-hour REI. Watercress can be harvested daily. With a longer REI, harvesters would not be able to travel through treated plots to get to plots that need to be harvested.

Crop: **Cucumber, broccoli, broccoli raab, Brussels sprouts, cabbage, cauliflower, Chinese broccoli, collard greens, kale, mustard greens, Chinese greens (Chinese cabbage), yams**

Labeling change of concern: Restricted Entry Interval (REI)

Growers of these vegetable crops need a 12-hour REI. Workers are in the field on a daily basis performing activities such as harvesting and weeding.

Crop: Papaya

Labeling change of concern: Maximum Number of Applications per Year

Depending on pest pressures and environmental conditions, papaya growers may require a maximum of .15 applications of malathion annually.

Many applications are needed because of the insect pest problems in papaya, especially, Stevens leafhopper, white peach scale, and possibly the papaya mealybug. White peach scale is a relatively recent introduction which is currently found only on the islands of Hawai‘i (where 92% of papaya production is located) and Kaua‘i. White peach scale is a serious post-harvest pest and can result in rejection of export shipments if found.

Malathion is the only broad-spectrum insecticide available for papaya production. It is used for contact control of leafhoppers, white peach scale and other insects, such as mealybugs, grasshoppers and thrips. Malathion does not kill the adult white peach scale, but it does control the nymph and crawler stage of the insect. Because the residual is short, and malathion breaks down in 3-4 days in direct sunlight, .applications must be made frequently to control the insects. When pest populations are high, applications may be made with each spray cycle at two to three week intervals. A total of 13 to 15 applications are necessary for pest control.

Alternatives such as imidacloprid work well for leafhoppers but are expensive and require a concentrated spray program immediately after application to control mites, which, after imidacloprid application, may multiply rapidly and cause immediate and significant damage to the crop. Imidacloprid can be used only five times per year. Another alternative, spinosad is also highly effective, but very costly. Spinosad can only be applied twice annually. Due to the cost of these two products, the grower will tend to target only the affected growing areas with a separate spray application, rather than doing a tank mix with their other pesticides and spraying the whole tree. By doing this, they are increasing their production cost by having to do a separate application.

Leafhopper and white peach scale each have the potential to reduce production by 25 to 50 percent. It is estimated that, when pest pressures are high, growers could expect to see a crop loss of at least 30-40% damage if they were limited to four applications of malathion per year. Additionally, their cost of production would increase dramatically.

There are events where populations of pests (leafhoppers or white peach scale) explode and growers will spray at one- to two-week intervals for two or three applications. Then they will not spray for another month or two.

Therefore, limiting malathion to four (4) application per year will cause significant hardship to papaya growers. Many growers are immigrants from the Philippines and have great difficulty earning application certification so that they would be able to obtain a permit to purchase restricted pesticides. It is critical that unrestricted products such as malathion with the ability to control a wide spectrum of insects remain available to the growers. Otherwise, growers would experience significant economic hardship to and the viability of papaya production in Hawai‘i would be threatened.

Crop: **Macadamia Nuts**
Labeling change of concern: Maximum Number of Applications per Year

1. Macadamia nut growers require at least six (6) applications of malathion for use in **nurseries.** Malathion is a very effective insecticide that macadamia growers use to control the Red Banded Thrips (RBT), *Selenothrips rubrocinctus*, in the **nursery where grafted macadamia trees are propagated**. These thrips have a life cycle that lasts 28 to 43 days. The egg, larval, pre-pupal and pupal stages last 8-16, 8-16, 1-4, and 4-7 days, respectively. The trees are grown outdoors (no roof or enclosures) and are exposed to infestations from surrounding host plants. Serious outbreaks of RBT can arrest the development of rootstock and grafted trees. These outbreaks are normally brought under control with the use of malathion.

   Macadamia seeds are planted in a seed bed and will germinate in 4 to 6 weeks. The seedlings are then transplanted into pots and allowed to grow until the tree diameter at 18" above the pot surface is approximately 1 cm. Ten to twelve months of growth is needed to reach this stage before the seedling can be grafted with a scion from a preferred cultivar. RBT infestations will suppress seedling growth particularly during the first six months when growth is normally slow where seedling height will be 10"-12" tall. Growth thereafter is relatively good where seedlings can reach heights of 4'-6' in the remaining 4 to 6 months. Serious outbreaks of RBT can also suppress seedling growth during the last 6 months of the first year. After the trees are grafted, the growth from the scion must also be protected from RBT infestation. The total propagation time to develop a grafted tree that is ready for field planting takes a total of two years .

   The insecticide malathion is normally prepared at the dilution rate of 1.5 pints per 100 gallons of water (0.9375 lb ai per 100 gals. H2O) and applied at the rate of 24 gallons of prepared solution per acre (0.225 lb ai per acre). Two applications spaced 1 to 14 days apart are required to reduce the population. A third treatment with spinosad is made 21 days later to control any larvae and adults that remain. Spinosad has a longer residual activity, about a week, than malathion and is used to extend the pest control and to keep its population low. Only 4 applications of spinosad are allowed per year and therefore its use is limited to when it is most beneficial. This cycle can be repeated three (3) to six (6) times per year. Three repetitions are the most commonly required; six is quite rare.

2. With just two (2) applications of malathion per year, the growers expressed concerned about their lack of ability to control any new economic pests which may be introduced. If

such an introduction should occur, there would be the need for a product such as malathion for immediate control/eradication of the new pest.

Malathion is an effective tool and can be a good deterrent to a newly introduced insect pest. And it is highly probable that multiple treatments with malathion may be necessary to eradicate these new pests if they are found in mature orchards with full tree canopies where thorough coverage is required.

Hawaii's ecosystem and agricultural crops are vulnerable to introductions of invasive species. While not all introduced species become established or become agricultural pests, a risk assessment study at the Kahului Airport intercepted 125 insect species not previously known in Hawai‘i for a sampling period of 130 days, for an average of almost one insect species per day. Most of the agriculturally important pests of Hawai‘i are introduced species.

The *Pest Management Strategic Plan for Macadamia Nut Production in Hawai‘i* has identified seven insect pest groups which are economically or potentially economically important to macadamia nut production in Hawai‘i. However, in South Africa, the world's third largest producer of macadamia nuts, there are some 60 insect and two mite species identified which are known to attack macadamia trees and fruit. Of these, stink bugs are the most important and in addition to the green stinkbug, *Nezara viridula* (L.) which is also a serious problem in Hawai‘i, there are more than 30 other stinkbug species attack the flowers and developing nuts. In Australia, more than 150 that damage macadamia have been reported.

An emerging and possibly critical new pest in Hawai‘i is the macadamia felted coccid (*Eriococcus ironsidei*/Williams) (Hemiptera: Eriococcidae). This insect was first collected from macadamia trees in the South Kona area in March 2005 and later was positively identified. Some areas became heavily infested with this scale. This insect is originally from Australia, where it can become a severe problem on macadamia nut trees.

Malathion was not the main tool to manage this recently introduced pest. However, the concern of the macadamia nut growers for options in the event of an introduction of a potentially seriously damaging insect pest is not unfounded.

Crop: **Seed Corn** (refer also to letter from the Hawai‘i Crop Improvement Association, below)

Labeling change of concern: Restricted Entry Interval (REI)

The industry in Hawai‘i is concerned with and **opposed** to the 3-day restricted entry interval for detasseling and the 24 hour REI for all other activities (instead of the current 12 hour REI).

Malathion is used almost exclusively at time of pollination in corn nurseries and top cross/foundation seed production fields. Malathion helps control earworms that attack corn ears through the silk. It is at the time of silking when malathion is sprayed to control this pest. In top cross/foundation fields the female plants need to be detasseled before the same female plant silks emerge (thus assuring cross pollination and hybrid seed production). Detasseling requires several trips over several days through the same field in order to assure purity of the F1 seed produced from the cross pollination. A six day interval would not allow anyone into the field to complete the task of detasseling.

The industry is also **opposed** to the EPA suggested 24 hour REI for all other activities in seed corn fields from the standpoint that 1 full pollination day would be lost in the 24 hour cycle. Anyone who has pollinated corn nurseries understands that pollination windows are narrow and that to be locked out of an actively pollinating field for 24 hours hurts opportunities to make the desired hand pollinations. Twelve hour REI's are manageable from the standpoint that nurseries can be sprayed late in the afternoon and re entered the following morning, still within legal limits of the REI.

Crop: **Pasture and Rangeland**

Labeling change of concern: Maximum Single Application Rate

Malathion has been an important tool for the control of the yellow sugarcane aphid (*Sipha flava*, Forbes) in Hawaiian pastures and rangelands, since the discovery of the insect in the state in 1989. The only formulation available for control of YSA in pastures and rangelands in Hawai‘i is Clean Crop Malathion 57 EC. At current rates of 0.9375 to 1.25 lb ai/A, malathion provides moderate control of YSA. There is only one product available for the control of the yellow sugarcane aphid (*Sipha flava*, Forbes) (YSA) in Hawai‘i. Even at 1.25 lb ai/A (the maximum single application rate for forage grasses and bermudagrass), control of YSA is not 100%. Also, there is inconsistency for the maximum single application rate. For example, the value for bermudagrass and forage grasses is 1.25 lb ai/A and the maximum single application rate for pasture and rangelands, which consist of grasses and forage is 0.9375 lb ai/A. The maximum single application rate should be made consistent at 1.25 lb ai/A for all categories because they are similar.

Labeling change of concern: Maximum Number of Applications per Year

The YSA population dynamics are variable and dependant upon temperature, moisture and growing condition of the pasture and rangeland ecosystem. The YSA population in Hawai‘i can be maintained year round due to mild climatic conditions in the sub-tropical environment. Generally there are two population spikes, in late Spring – early Summer period and late Fall - early Winter periods, requiring multiple applications per paddock per year. Multiple applications per paddock per year may be required due to the multiple spikes per year observed in the YSA population dynamics. A maximum of eight (8) applications per year are required to control spread of the insects during the periods when the insect populations are rapidly expanding.

Labeling change of concern: Minimum Application Interval

In Hawai‘i, the minimum application interval needed for pasture and rangeland is one (1) day. Most of the control is done by spot treatment and not the entire pasture area. In pastoral systems, normally there are multiple paddocks which breaks up the whole pasture/grazing area and the animals are rotated to each paddock. The re-treatment interval could be zero days, as long as there were no cattle in the paddock at the time of treatment.

Labeling change of concern: ULV formulation only

While there is a ULV formulated product licensed for sale in the state, the only formulation available for control of YSA in pastures and rangelands in Hawai‘i is Clean Crop Malathion 57 EC. For practical purposes, this limitation renders malathion unavailable to Hawai‘i's producers. If it were available, the licensed product requires special equipment which may not be affordable or may not be available for the application methods used by Hawai‘i's ranchers.

STATEMENT FROM THE HAWAII PAPAYA INDUSTRY ASSOCIATIUON
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In response to the proposed limiting of malathion application for papaya crops, this action is deemed very detrimental to papaya growers in Hawaii. Faced with a variety of insect pests already established in the islands as well as newly introduced and possible introductions in the future, which has been a fact of life, growers need a reliable general purpose insecticide to continue farming operations. In general practice malathion is not used on a regular schedule, but only when pest outbreaks require it. However, being a tropical environment numerous outbreaks by different pests require multiple applications throughout the year. A restriction as proposed will nullify any pest control program for papayas.

As with any given outbreak of pests, established or introduced, if not controlled immediately will result in tremendous losses for farmers. As any farmer knows, a serious outbreak if not controlled effectively and immediately, can lead to catastrophic losses up to and including complete crop failure.

Respectfully submitted,

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Re: Re-registration of Malathion by the EPA and the HCIA opposition points.

Cathy,

Once again thank you for your vigilance by keeping The Hawaii Crop Improvement Association (HCIA) abreast of the EPA re-registration notices. The HCIA position on Malathion is that this is an important chemistry for the control of earworms in seed corn fields. This is even more apparent in Hawaii where the choice of earworm chemistries is tightly restricted. The 1 lb rate / acre, two total applications per crop, 5 day reuse interval and the 5 day harvest interval suggested by the EPA all fall within Hawaii seed industry use patterns.

The area we are concerned with and **opposed** to is the 3 day re-entry interval for detasseling and the 24 hour re-entry interval (instead of the current 12 hour REI). Malathion is used almost exclusively at time of pollination in corn nurseries and top cross/foundation seed production fields. Malathion helps control earworms that attack corn ears through the silk. It is at the time of silking when Malathion is sprayed to control this pest. In top cross/foundation fields the female plants need to be detasseled before the same female plant silks emerge (thus assuring cross pollination and hybrid seed production). Detasseling requires several trips over several days through the same field in order to assure purity of the F1 seed produced from the cross pollination. A 3-day interval would not allow anyone into the field to complete the task of detasseling, thus rendering it useless in terms of a systematic method to controlling Corn Earworms.

The HCIA is also **opposed** to the EPA suggested 24 hour re-entry interval in seed corn fields from the standpoint that 1 full pollination day would be lost in the 24 hour cycle. Anyone who's pollinated corn nurseries understands that pollination windows are narrow and that to be locked out of an actively pollinating field for 24 hours hurts opportunities to make the desired hand pollinations. Twelve hour REI's are manageable from the standpoint that nurseries can be sprayed late in the afternoon and re entered the following morning, still within legal limits of the REI.

In an effort to increase understanding I am submitting the following responses to the questions the EPA has posed.

1. **Why is a 12 hour REI needed for Seed Corn ?**

The seed corn industry in Hawaii is based on continuous nursery/field operations. In other words we grow corn in the State 12 months of the year; hence there is no winter fallow period in which insect pest population cycles can be controlled. Serious pests include Brown Plant hoppers (*Perigrinus maydis*) that transmit MMV (Maize Mosaic Virus), Thrips (*Frankliniella* spp.) that can transmit CLN (Corn Lethal Necrosis), Beet army worms (that can devastate a field if left unchecked and Corn earworms (*Helicoverpa zea*) that attack the developing ear. The first 3 insect pests are generally a problem in the early stages of corn growth where a 24 hour REI is not consequential. The Corn earworm though is a different story. Its behavior is to attack seed that is developing on the ear. The Hawaii seed industry produces a lot of seed in what is called Cross fields and also in Top-cross fields. Cross fields are large fields (often greater than 1 acre); these fields consist of a single male genotype that pollinates a single female genotype. Seed produced from this mating design produce F1 hybrids. Top-cross fields are used to produce many different F1 hybrids that go on for further testing. These fields have a single male genotype that is used to pollinate many different female genotypes. Because Top-cross fields have so many different females in them they have a wide range of dates in which the Female tassel can appear.

Needless to say, it is imperative to de-tassel the female prior to the tassel producing pollen in order to assure no self –contamination. In order to do this crews of people are sent into the fields to either mechanically or hand pull the tassels (often it can be both). This is not a one day operation; rather several trips are required to assure a uniform detasseled field, especially in the Top-Cross fields where the wide range of females could stretch detasselling out for more than 1 week. Since corn will pollinate itself and since the window of pollination can be stretched out over 3-7 days (depending on the tassel characteristics) it is necessary to enter the fields every day to detassel in order to avoid self-pollination (which renders the seed useless for further study or development).

Because the Hawaii Dept of Agriculture has clamped down on the registration of the newer insecticides that have been recently developed, the seed industry is left with few options to control Corn Earworms. Chemistries that have Carbamate or Organo-Phosphate backgrounds are pretty much what we have left in our arsenal to control these pests. In addition, the few other types of chemistries available (Pyrethroid–based, Spinosad etc.) should be used in a rotation strategy so resistance does not build up in the target pest. Malathion therefore helps with controlling the pest while at the same allowing the seed companies to rotate to the few other effective chemistries we have available to us at this time in Hawaii.

2. **If the growers do need a shorter REI would they consider a lower application rate for the crop ?**

Perhaps, the industry might consider a lower application rate of Malathion to control earworms based on the discussion in Question 1 in which resistance to Malathion is a very real concern. Another option the industry would agree to however, is a single

application of Malathion to flowering corn (the other application could be applied to corn in the earlier vegetative stages of growth). If the Seed industry would be allowed a single application at flowering and a 12 hour REI we would forgo using further application of this chemistry. This compromise will provide the industry with an alternative chemistry that can be used to kill corn earworms while reducing the risk of resistance build up.

3. Other comments: Because the seed industry is limited in the variety of insecticides it can use in Hawaii (this limitation is not felt in mainland North America), the few remaining pesticides we can use need to be used judiciously. A well conceived spray program that includes a single application of Malathion while still allowing crews to enter the field and remove tassels (12 hr REI) is a compromise the Hawaii Seed Industry can agree with.

Thanks Cathy,

Sincerely,

Michael Austin