



Carbaryl Use in Arizona and New Mexico
Prepared by Alfred Fournier, Peter C. Ellsworth, and Wayne Dixon
Comments submitted to USDA Office of Pest Management Policy
by the Arizona Pest Management Center
University of Arizona

Summary

The use of carbaryl has diminished greatly in recent years across a wide variety of crops in the Southwest. There are still selected uses for which carbaryl is deemed important. The most significant of these is its use, in rotation with pyrethroids, in the eradication program for the pecan weevil, an important invasive pest of pecans that has made recent incursions from West Texas into Eastern New Mexico. **Loss of carbaryl would significantly impact the New Mexico Department of Agriculture's ability to slow the spread of pecan weevil throughout New Mexico, Arizona, California, and northern Mexico.** Carbaryl baits are also used in Arizona in the management of chinch bugs and for darkling beetles in watermelon transplants. Darkling beetles in particular can devastate a stand of watermelon transplants, causing significant economic losses. Carbaryl baits also see occasional use for control of grasshoppers in Arizona lettuce.

Who We Are

The Arizona Pest Management Center is host to the University of Arizona's expert IPM scientists including Ph.D. entomologists, weed scientists and plant pathologists with expertise in the strategic tactical use of pesticides within IPM programs that protect economic, environmental and human health interests of stakeholders and the society at large.

Dr. Peter Ellsworth is Director of the APMC, State IPM and Pesticide Coordinator for Arizona and Professor of Entomology / Extension IPM Specialist with expertise in developing IPM systems in cotton and other crops and measuring implementation and impact of IPM and pest management practices. Dr. Al Fournier is Associate Director of the APMC / Adjunct Associate Specialist in Entomology, holds a Ph.D in Entomology, and has expertise in evaluating adoption and impact of integrated pest management and associated technologies. He serves as a Comment Coordinator for the Western IPM Center, representing stakeholders in the desert Southwest states. Mr. Wayne Dixon holds a B.S. in Computer Information Systems and develops

tools and data used in IPM research, education and evaluation, including management of the APMC Pesticide Use Database.

These comments are the independent assessment of the authors and the Arizona Pest Management Center as part of our role to contribute federal comments on issues of pest management importance and do not imply endorsement by the University of Arizona or USDA of any products, services, or organizations mentioned, shown, or indirectly implied in this document.

Our Data and Expert Information

Through cooperative agreements with Arizona Department of Agriculture, the Arizona Pest Management Center obtains use of, improves upon, and conducts studies with ADA's Form L-1080 data. Growers, pest control advisors and applicators complete and submit these forms to the state when required by statute as a record of pesticide use. These data contain information on 100% of custom-applied (i.e., for hire) pesticides in the state of Arizona. Grower self-applied pesticide applications may be under-represented in these data. In addition, the Arizona Pest Management Center is host to scientists in the discipline of IPM including experts in the usage of this compound in our agricultural systems. We actively solicit input from stakeholders in Arizona including those in the regulated user community, particularly to better understand use patterns, use benefits, and availability and efficacy of alternatives. The comments within are based on the extensive data contained in the Arizona Pest Management Center Pesticide Use Database, collected summary input from stakeholders and the expertise of APMC member faculty.

Use in Arizona Crops:

The Arizona Pest Management Center Pesticide Use Database indicates quite low and diminishing acres treated with carbaryl for a small number of crops (including cotton, lettuce, melons and citrus) since 2008.

Cotton. Carbaryl is no longer registered for use in cotton in Arizona. Dr. Peter Ellsworth, University of Arizona Extension IPM Specialist working in cotton, confirms that there are better control options available for major cotton pests that are more consistent with conservation of natural enemies in the system. However, there are rare, unusual occurrences when a cotton stand is being invaded by surface migrating darkling beetles out of the desert or other areas. There have been times when carbaryl applied to alfalfa has been used as a bait/barrier to these beetle entering fields. Grasshopper control outside of cotton is another possible use for carbaryl. Both are unusual needs and rare, but important, uses when these situations occur.

Lettuce. According to the 2003 Lettuce Pest Management Strategic Plan for lettuce in California and Arizona, carbaryl provides average control of lepidopterous larvae in lettuce, including alfalfa looper, beet armyworm, cabbage looper and corn earworm. Dr. John Palumbo, University of Arizona Extension Entomologist and Vegetable IPM Specialist, states that carbaryl is "not used much, if at all, by any Pest Control Advisors (PCAs) I am aware of in lettuce

anymore. There are much better alternatives, and certainly for Lepidoptera larvae.” He noted one possible exception, its use in baits for grasshoppers, an occasional pest.

Watermelon. One central Arizona grower I spoke with noted the importance of Sevin bait for control of chinch bugs and for darkling beetles in watermelon transplants. This use has great economic importance. “As you know, darkling beetles can and will devastate an expensive stand of watermelon transplants. It is not widely used, but for this pest, and chinch bugs, it is important. We do not use much active ingredient, but when we do it is vital!”

Carbaryl has Important uses in Pecans in New Mexico and Arizona

According to Richard Heerema, Pecan and Pistachio Specialist with NMSU, “Carbaryl is labeled for use against most of the important insect pests in pecan: black-margined pecan aphids, black pecan aphids, pecan nut casebearer, pecan weevil and others. But in my experience, the primary use for carbaryl in pecans is against pecan weevil.” The pecan weevil recently moved into Eastern New Mexico from Western Texas. “The New Mexico Department of Agriculture has conducted several eradications of this pest, but the pest has continued to be detected in many areas around the eastern part of the state.” Eradication efforts are ongoing.

Brad Lewis, Assistant Professor and Insect IPM Specialist with New Mexico State University summarized the use of carbaryl in the New Mexico pecan industry:

Although carbaryl has limited use in commercial pecan orchards in New Mexico, it does serve as a niche product for several target insects including stink bug and pecan foliage feeders such as walnut caterpillar and webworm. The aforementioned tend to be clumped and so are spot treated. Other efficacious products are available for this use and the loss would not have a significant impact on commercial pecan orchards.

Within New Mexico, **its primary importance is related to New Mexico Department of Agriculture’s pecan weevil eradication programs.** The repeated applications for eradication of pecan weevil necessitates a rotational product. Carbaryl is the department’s primary rotational product when paired with a pyrethroid. To the best of my knowledge, no other product is available for this use. **Loss of carbaryl would significantly impact the department’s ability to slow the spread of pecan weevil throughout New Mexico, Arizona, California, and northern Mexico.**

The other important use in New Mexico in pecans is by non-commercial or small orchard owners. Available products do not required a restricted use license, are available in smaller quantities, and efficacious against pecan nut casebearer. Loss of carbaryl for the aforementioned use would increase the difficulty for home

and small orchard owners to control one of the widespread economic pests in their trees.

Mr. Lewis was able to respond in more detail to some of the specific questions put forward by OPMP with respect to carbaryl use in pecans:

What are the typical application rates for carbaryl in pecans? We recommend to the growers participating in NMDA's pecan weevil eradication program 3-4 quarts, of 4 lb. A.I./Gallon material per acre.

How many applications are typically needed each season (on what percent of acres), and at what intervals? Depending on rain and irrigations, we would like an application of carbaryl or a pyrethroid on the trees every 10 days in commercial orchards. For urban pecan trees 3-4 quarts per acre every 10 days, not to exceed labeled limits. Approximately 100 commercial acres and 30 or so urban pecan trees are currently being treated for pecan weevil in New Mexico.

What are the other effective management options (if any), if carbaryl were no longer available? (These could be chemical or non-chemical options) And how do they compare with carbaryl in terms of efficacy and cost? We have found the pyrethroids to be more inexpensive and more efficacious than carbaryl for the management of pecan weevil. Unfortunately when multiple applications of pyrethroids are made, we reach the limits of total AI per acre before the end of our treatment period. Carbaryl has demonstrated to be efficacious and does not require licensing for restricted use pesticides (most commercial pyrethroids are restricted use). Insecticides are the only management tool available for eradication of pecan weevil. Pecan weevil is continually re-introduced into the state and has successfully been eradicated in four locations using carbaryl with a pyrethroid or carbaryl alone.

Can you estimate potential yield impacts and / or economic outcomes for pecan growers if carbaryl were not available? Eradication of pecan weevil would become more difficult, if not impossible, if carbaryl were to be removed from the market place. Western pecan producers in New Mexico, California, Arizona, and pecan growing states in Northern Mexico have made the prevention of pecan weevil establishment in New Mexico a high priority. Eradicating introductions into New Mexico prevents the pecan weevil's movement from infested states (Texas, Oklahoma, and all southern pecan growing states) to significant pecan growing areas in uninfested states (California, the rest of New Mexico, Arizona, northern Mexican states of Chihuahua and Sonora). Western pecan production is considered high-input production that results in the highest pecan yields (per acre) compared to southern states. Establishment of pecan weevil in western states would increase production costs (approximately \$75-\$100/acre), due to repeated insecticide applications and, perhaps, reduce the exportability of in-shell product to other countries requiring treatment for pecan weevil. I would estimate total pecan acres in western areas not infested with pecan weevil (New

Mexico, El Paso Valley of Texas, Arizona, and California) to be approximately 85,000 acres and growing.

According to Joshua Sherman, Area Assistant Agent, Commercial Horticulture, University of Arizona Cooperative Extension, Cochise County works extensively with pecan producers in Southeastern Arizona, there is not much use of carbaryl in Arizona pecans. “If growers are going to use carbaryl, it might be a secondary product for use against webworm, but does not appear to be used very much in general.” He noted one important exception, however, which is the potential need for its use against the pecan weevil, a serious potential invasive pest threat to the growing Arizona pecan industry (see below).

An Arizona Pest Control Advisory (PCA) who works with pecan and pistachio growers confirmed that in general, carbaryl is not used much in pecans. “We have newer, better chemistries available for the pests we are fighting today. We try to use softer chemistries as much as possible.” However, he commented that he would be concerned about loss of registrations for carbaryl in pecans, specifically because of the rapid increase in pecan acres in the state. This includes the establishment of new nurseries recently, and new varieties of pecans with which growers do not yet have experience. “The loss of this tool in pecans could have important negative economic impacts in the future.”

According to John Caravetta, Associate Director of the Arizona Department of Agriculture (ADA), who manages the invasive pest monitoring program, the ADA is conducting significant surveillance for this pest in Arizona pecans. “It has made incursions into New Mexico and is being effectively dealt with by New Mexico Department of Agriculture and the growers to prevent its establishment and spread into other areas of NM and AZ. Currently, we are free from this pest.” As noted above, carbaryl is a critical component of the NMDA eradication and management program. He added, “The importance of carbaryl for this use cannot be overstated. It also has relevance for other pests of concern for which it is currently labelled. Many potential pest threats we face in Arizona require all quarantine treatment tools possible, as we do not know what invasive pests may threaten us that are not currently in the U.S. We need a maintain a robust tool box to guard against potentially devastating economic losses that are possible with invasive pests.”