Western IPM Center

Western Integrated Pest Management Center

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August 11, 2015

Marietta Echeverria, Chief
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Registration Division
Office of Pesticide Programs

RE: Docket EPA-HQ-OPP-2014-0818-0109 Mitigation for Pesticide Products that are Acutely Toxic to Bees

This comment is being provided from the Western IPM Center in response to Docket EPA-HQ-OPP-2014-0818-0109, Mitigation for Pesticide Products that are Acutely Toxic to Bees. This comment includes information from California. Additional comments will be provided from the sub-regional comment coordinators of the Western IPM Center.

Protection of managed pollinators is important for California agricultural production since many of the specialty crops grown in California rely on pollination services. In addition, California has a robust beekeeping industry that produces honey and other bee-derived products. However, it is also important to note that crops such as mandarins need protection from bees in order to remain seedless. Seeded mandarins are much less desirable in the market and mandarin growers strive to produce seedless fruit. See also attached letter from California Citrus Mutual.

Pollination services are contracted between growers and beekeepers. Both parties have economic interest in protecting the health of bees and work together to achieve the simultaneous goals of pollinator protection and managing crop pests. The proposed EPA ban on application of 76 active ingredients during bloom in crops with contracts for pollinator services inserts additional regulations into a contract relationship between beekeepers and growers.

USDA/ERS Publication FTS-357SA, *U.S. Pollination-Services Market* erroneously lists grapes as one of the top ten crops with pollination services. Vinifera grapes are self-pollinated and do not require pollination services. This error is noted to avoid potential impact on the viticulture industry in relation to the EPA proposal.

California has strong regulations for protection of managed beehives. California's regulations integrate a number of concepts to achieve pollinator protection including any products with the phrase "toxic to bees," time of the day when bees are likely to be active, residual toxicity time, and registered beehives within one mile of the pesticide application site. See also attached *California Code of Regulations Title 3. Food and Agriculture, Division 6. Pesticides and Pest Control Operations, Chapter 3. Pest Control Operations, Subchapter 2. Work Requirements, Article 3. Protection of Bees.* Unlike the California regulations that apply to registered beehives within a mile of an application site, the EPA proposal is limited to the "site" of the crop and does not consider the foraging range of bees. In addition, the term "site" is undefined. Is the "site" the location of the specific crop with pollination services or is it the entire property managed by the grower who is contracting for pollination services? The specific interpretation of "site" will have an enormous impact on the effects of the proposed regulation.

In contrast to crops that require pollination services, some mandarin varieties require protection from bees in order to produce seedless fruit. See also letter from Dusty Ference at California Citrus Mutual. Pollen introduced into the mandarin grove by bees carrying pollen from neighboring citrus will result in seeded mandarins. Seeded mandarins are less desirable in the market and growers receive lower prices for seeded fruit. See also Table 1. *Preliminary Pollination and Seediness Guide* in the extension article *Mysteries of Mandarins: Sex Seedlessness and New Varieties*. Seedless mandarin growers attempt to isolate their fields from other citrus and bees in order to remain seedless. If that is not possible or sufficient, growers will cover trees with netting in order to exclude bees, thereby increasing production costs. *California Code of Regulations Title 3. Food and Agriculture Division 3. Economics Chapter 1. Fruit and Vegetable Standardization Subchapter 4. Fresh Fruits, Nuts and Vegetables Article 22. Citrus (Refs & Annos)* provides protection for seedless mandarin growers and a mechanism for resolving disputes with beekeepers.

Sincerely,

Jim Farrar, Director
Western IPM Center

California Code of Regulations

Title 3. Food and Agriculture
Division 6. Pesticides and Pest Control Operations
Chapter 3. Pest Control Operations
Subchapter 2. Work Requirements
Article 3. Protection of Bees

§ 6650. Pesticides Toxic to Bees.
(a) Pesticides toxic to bees are those that include the words "toxic to bees" on the labeling of the pesticide, regardless of modifying words on the label that state "highly" or "moderately."
(b) Bees are considered to be inactive from one hour after sunset to two hours before sunrise or when the temperature is below 55 degrees Fahrenheit. The sunset and sunrise times will be those indicated in the local newspaper.
(c) Residual toxicity (RT) time is that period of time after completing a pesticide application until there is minimal toxic effect to bees. The RT time is specified on product labeling and is based upon Residual Toxicity $_{25}$ (RT $_{25}$) studies. RT $_{25}$ studies determine 25 percent bee mortality based on the test bee population exposed to the formulated pesticide product applied to foliage.
Note: Authority cited: Section 29102, Food and Agricultural Code. Reference: Sections 29100 and 29102, Food and Agricultural Code.

§ 6654. Notification to Beekeepers.
(a) Each person intending to apply any pesticide toxic to bees to a blossoming plant shall, prior to the application, inquire of the commissioner, or of a notification service designated by the commissioner, whether any beekeeper with apiaries within one mile of the application site has requested notice of such application.
(b) If the person performing pest control is advised of a request for notification, he or she shall notify the beekeeper, at least 48 hours in advance of the application, of the time and place the application is to be made, the crop and acreage to be treated, the method of application, the identity and dosage rate of the pesticide to be applied and how the person performing pest control may be contacted by the beekeeper. This time may be increased or decreased by the commissioner, or by a agreement of both the beekeeper and the person performing the pest control work.
(c) This section shall apply statewide. However, from March 15 through May 15 in a citrus/bee protection area, if there are conflicts between the provisions of this section and those of section 6656, section 6656 shall prevail.
Note: Authority cited: Section 29102, Food and Agricultural Code. Reference: Section 29102, Food and Agricultural Code.

§ 6652. Availability for Notification.
(a) Each beekeeper who desires advance notice of applications of pesticides shall inform the commissioner of a two-hour period between 6 a.m. and 8 p.m. each day, during which time the beekeeper shall be available for contact, at the beekeeper's expense, to receive

advance notice from persons intending to apply pesticide(s). This request for notification shall expire on December 31 of each year.
(b) This section shall apply statewide. However, from March 15 through May 15 in a citrus/bee protection area, if there are conflicts between the provisions of this section and those of section 6656, section 6656 shall prevail.
Note: Authority cited: Sections 11456 and 29102, Food and Agricultural Code.
Reference: Section 29102, Food and Agricultural Code.

§ 6656. Citrus/Bee Protection Area.
(a) The area within one mile of any citrus planting of one acre or more in Fresno, Kern or Tulare county is designated as a citrus/bee protection area.
(b) The citrus bloom period, in any citrus grove, for purposes of declaring bloom and label interpretation, shall be from when 10 percent of the total citrus blossoms are open until 75 percent of the blossom petals on the north side of the trees have fallen.
The commissioner shall give public notice of the official beginning and ending dates of each citrus bloom period for each citrus growing district in the county, at least three days before establishing such dates.
(c) Pesticide applications may be made 48 hours or more after the official end of citrus bloom without advance notification to beekeepers until March 15 of the following year pursuant to section 6654(c). Growers/pesticide applicators wishing to make pesticide applications prior to 48 hours after the official end of bloom shall follow the inquiry and notification procedures specified in subsections (a) and (b) of section 6654.
(d) Each person who owns or operates any apiary within a citrus/bee protection area from March 15 through May 31, shall file a written notice of apiary location with the commissioner before March 15 and shall update such notice, including notice of departure from the citrus/bee protection area.
(e) Within a citrus/bee protection area, each beekeeper who desires notification of applications of pesticides shall be available for telephone contact at the beekeeper's expense between 4:00 p.m. and 7:00 p.m., Monday through Saturday from March 15 through May 31, to receive advance notice from persons intending to apply pesticide(s).
(f) Any person intending to apply a pesticide toxic to bees to citrus during a citrus bloom period, except as otherwise provided in this subsection, shall file a notice of intent with the commissioner as provided in section 6434(b) at least 48 hours prior to the intended application. This subsection shall not apply to pesticides listed in section 6656(g) applied when bees are inactive.
(g) Notwithstanding section 6654(b), the following pesticide applications may be made within a citrus/bee protection area during the citrus bloom period when bees are inactive without notification to beekeepers:
(1) Methomyl (Lannate);
(2) formetanate (Carzol);
(3) Chlorpyrifos (Lorsban);
(4) Any pesticide applied so that the RT period shown on the labeling will expire before the next period of bee activity.
(h) Except for applications of pesticides listed in subsection (g), and applications of pesticides that are not toxic to bees, within a citrus/bee protection area during the citrus

bloom period, an application delay of 48 hours or more requires that the person intending to apply the pesticide recontact beekeepers and inform them of the change in scheduling.
(i) The following applications to citrus are prohibited within a citrus/bee protection area:

(1) Carbaryl (Sevin) from first bloom until complete petal fall.

(2) Any pesticide toxic to bees, except those exempted in subsection (g) during a citrus bloom period, unless the need for control of lepidoptera larvae or citrus thrips (Scirtothrips citri) has been established by written recommendation of a representative of the University of California, Agricultural Extension Service, or a licensed agricultural pest control adviser. The recommendation shall state either that the citrus planting does not meet the citrus bloom period criteria, or why alternatives less hazardous to bees would not be effective.

For azinphosmethyl (Guthion), this requirement shall remain in effect until complete petal fall.

Note: Authority cited: Sections 11456 and 29102, Food and Agricultural Code. Reference: Sections 29100, 29101 and 29102, Food and Agricultural Code.

California Citrus Mutual

June 17, 2015

Jack Housenger, Director
US Environmental Protection Agency
Office of Pesticide Programs
1200 Pennsylvania Ave., NW
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Dear Director Housenger:

The California citrus industry is currently burdened by numerous rules and regulations with regard to pesticides. The EPA's proposal to protect pollinators potentially creates another hindrance on a grower's ability to produce good healthy food in California.

During bloom each season, a period of time determined by the Agricultural Commissioner's office in each producing county, pesticide restrictions are increased in order to protect pollinators. During this time, should a grove require treatment with a pesticide known to be dangerous to the health of pollinators, growers are required to notify the Ag Commissioner's office prior to application allowing Commissioners time to notify beekeepers of upcoming pesticide applications near them. Additionally, the application must be made during hours when pollinators are not actively foraging. Typically the application would begin one hour after sunset and applications must be completed two hours before sunrise.

These steps are taken in order to protect an insect pest that is not necessary to produce citrus. Not only are pollinators not necessary, in the case mandarins they are detrimental to the grower's ability to produce a marketable piece of fruit.

While pollinator safety is of concern creating another layer of safety at the expense of a grower who classifies pollinators as trespassers and a pest that causes negative economic impact is not an option. Creating regulations to maximize the viability of one industry/commodity while reducing the ability of producers in other production areas to do likewise would not be a balanced approach. Thus, anything more onerous than what presently exists for our industry is not acceptable.

Best Regards,

Dustin Ference

Dustin J. Ference
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California Citrus Mutual

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Mysteries of Mandarins

Sex, Seedlessness, and New Varieties

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Mandarins and tangerines are receiving a lot of attention lately. But what is a mandarin and is it different from a tangerine? Some people incorrectly think that whatever comes in a can are mandarins and the rest are tangerines. Still for other people in the U. S. the words "mandarin" and "tangerine" are often terms used interchangeably to designate the mandarin group. This is not completely correct because the term tangerine was coined for "Dancy" mandarins which were imported from Tangiers and subsequently called tangerines. The word tangerine became associated with mandarins with orange-red rind color like "Dancy" and later in the U. S. for the whole mandarin group. Yet the term "mandarin" is an older term that is used throughout the world to represent the entire group.

Mandarins are known to be able to produce hybrids by crossing with other mandarins or with other types of citrus such as sweet oranges which are designated "tangors" or with grapefruits (pomelo) or pummelos which are designated "tangelos." Recently the terms "tangerine" and "mandarin" have been used together along with the terms "tangor" and "tangelo" to represent all mandarins and mandarin hybrids that resemble mandarins. Several of the new hybrids such as Yosemite Gold™ mandarin hybrid are not hybrids between two types but are more complex. Yosemite Gold™ is a hybrid between "Temple" (Royal) tangor, a mandarin x sweet orange hybrid, with two other mandarins, "Dancy" and "Encore." There are also mandarin hybrids such as Cocktail "grapefruit," a hybrid of "Frua" mandarin and a low acid pummelo (CRC 2240), that does not resemble a mandarin, nor is considered as a mandarin.

What makes this even more complicated is that recent genetic data proposed that there are only three primordial or fundamental citrus species in the Citrus subgenus: the mandarin (C. reticulate Blanco), the citron (C. medica) and the pummelo (C. maxima). All other types of citrus such as the sweet oranges arose from single or sequential crossing events, which produced hybrids between these three fundamental species or their offspring. Lemons, limes, sour oranges, sweet oranges and grapefruit types are now thought to have arisen as hybrids of these three primordial species and papedas and kumquats. Simply, all mandarins and hybrids such as tangors, tangelos and complex hybrids that resemble mandarins are best categorized as mandarin and mandarin hybrids.

WHAT MAKES A MANDARIN A MANDARIN?

Mandarins alone, without including the hybrids that appear like mandarins, is a large and varied group. Mandarin trees are small to medium in size with slender twigs and small branches. The leaves are dark green in color, with long slim simple leaf blades with smooth leaf margins. The leaves have long petioles, the structure that connects the leaf to the stem, with very small wings that resemble small leaves on each side of the petiole. The fruits are almost always flattened and depressed at the stem and stylar (opposite) ends of the fruit. At maturity, mandarin fruit have a hollow core and the segments tend to pull away from each other. The peel of mandarin fruit is loose at maturity, which explains why they are sometimes called a "zipper skinned" fruit. In the past they were also called "kid glove" oranges because the pickers needed to use gloves so as not to damage these fruit that tend to be more delicate than sweet oranges, like Navel oranges. Also mandarins have a greater tendency to alternate bear than Navel oranges. Alternate bearing means that they will produce a larger than normal crop one year followed by a lighter than normal crop the next year.

Mandarin varieties also vary greatly in their ability to produce seeds unlike all of the different Navel orange varieties. When grown in either a mixed or single variety block planting, some mandarin varieties will produce fruit with no seeds, some will have few, and other will have as many as 40 seeds per fruit. To understand why certain mandarin varieties will produce seedless or seeded fruit, one needs to know a few basics about citrus sex.

[1] Dr. Kahn is the curator of the Citrus Variety Collection and conducts research on seedlessness and the commercial potential of new citrus varieties to California in the Department of Botany and Plant Sciences, UC Riverside.

[2] Dr. Chao is the Assistant Cooperative Extension Specialist and Assistant Horticulturist, Department of Botany and Plant Sciences, UC Riverside. Dr. Chao's extension and research at UCR focuses on issues related to mandarin production and management in California and new mandarin cultivar production evaluation.

CITRUS SEX AND SEEDLESSNESS

Most citrus flowers have both sexes within a single flower. The pollen within the anthers holds the male sex cells or sperm. The pistil is the female part of the flower in the center with the ovary or spherical structure at the base. Within the ovary, which will develop into the fruit, are the ovules that will become seeds if pollination and fertilization occurs.

Varieties that produce few or no pollen and few or no functioning ovules will be very low seeded or seedless no matter what other citrus varieties are growing around them (See Table 1). Examples of varieties that have no functioning pollen and none to very few functioning ovules include all Navel orange and Satsuma mandarin varieties. "Midnight" and "Delta" Valencia oranges, and "Pixie," "Gold Nugget" and "Seedless Kishu" mandarins have none to very few functioning pollen and ovules. The UCR developed varieties Shasta Gold™, Tahoe Gold™, Yosemite Gold™ mandarin hybrids, as well as "Oroblanco" and "Melogold" that are grapefruit x pummelo hybrids are triploid meaning that these varieties have three copies of the chromosomes instead of the normal two. This makes it very difficult to produce functional pollen and ovules, but will occasionally produce a few. So these varieties and especially the Navel and Satsuma varieties which produce no functioning pollen, have a very low ability to serve as a pollen source to make other varieties seedy (Table 1).

Some citrus varieties have numerous functional pollen and ovules. Self-pollination within one of these citrus varieties will cause the fruit to be seedy no matter whether they are grown in an isolated single variety block or in a mixed variety block (Table 1). One example is the Florida "Honey" ("Murcott") mandarin which will be seedy no matter where it is grown. While other varieties that have many functional pollen and many functional ovules, but are self-incompatible and they will be seedless only if grown as an isolated single variety block (Table 1). Self-incompatibility is a genetically controlled system specific to certain mandarin varieties such as Clementine varieties, "W. Murcott Afourer" mandarin, "Page" mandarin, "Minneola" tangelo and pummelo varieties such as "Chandler" and "Reinking." Pollination within and between flowers of these varieties that are self-incompatible will not result in fertilization or seed development and as a result they will be seedless. However, if these varieties are grown near others varieties that can cross-pollinate them, then fruit of these self-incompatible varieties can be very seedy (Table 1).

THE ISOLATION OF SELF-INCOMPATIBLE VARIETIES TO PROMOTE SEEDLESSNESS

Isolating self-incompatible varieties may not be easy in a state like California that produces hundreds of crops, many requiring cross-pollination by honeybees in order to set fruit or produce seeds. Honeybees that are the most common pollinator of citrus flowers are also common in California during the blooming period for mandarins. In order to have isolated single variety block plantings of a self-incompatible mandarin like the Clementine varieties, one would need to carefully select a site that would isolate the Clementines from other citrus. Or one would need to have large plantings as a solid block to create enough isolation, prevent cross-pollination and produce seedless fruit. Or another possible way to isolate a self-incompatible variety would be to plant Navel oranges or Satsuma mandarins as a buffer surrounding a self-incompatible variety since they produce no functional pollen. Recent experiments conducted by C Thomas Chao in 2002-2003 using two California mandarin orchards has found that the number of "buffer" rows needed to isolate a self-incompatible mandarin variety was much higher than the original recommendation of 5-20 rows in California. Greater than 116 rows of a "buffer" variety such as Satsuma or Navel variety may be needed to prevent cross-pollination and assure that seedless fruit will be produced. And even greater empty space between compatible varieties would be needed to prevent cross-pollination.

NECESSITY OF A STIMULUS FOR FRUIT SET VARIES AMONG MANDARIN VARIETIES

Most flowering plants require pollination and fertilization in order for the fruit to develop. Yet some citrus varieties are to produce fruits without the stimulus of pollination and fertilization that is responsible for seed development. For example Navel orange varieties that do not make functional pollen and make none to few functional ovules are still capable of setting fruit. Research conducted by Tracy Kahn, C. Thomas Chao and others has shown that the tendency to produce fruit in the absence of pollination and fertilization varies among mandarin varieties. Satsuma varieties are also capable of producing fruit without seeds like Navel orange varieties, but Clementine selections and other self-incompatible varieties such as "Minneola" and "Orlando" will have low fruit yield when cross pollination and seed set is prevented. They will produce greater yield when cross pollination occurs. Unfortunately, with cross pollination, the fruit of these varieties would be seedy. Yet with cross pollination the fruit will also tend to be larger. Self-incompatible varieties grown in isolation or surrounded by "buffer" varieties may produce low yield. Gibberelic acid is often required in the absence of cross-pollination to increase fruit set in these cases.

Throughout the world seedlessness is an important characteristic for marketing citrus fruit. The desire for seedless fruit is influencing growers' choices about which cultivars to plant. Among the different mandarin cultivars available, the Clementine selections are now the most popular in the world. Many superior cultivars have become commercially important in Spain, Morocco and South African in their local markets and in the export market. During the past few years in California, there has been an increase in acreage of newly introduced Clementine selections to help capture this market. According to the Bureau of Census, DOC, during the past decade there has been both an increase in importation and consumption of mandarins in the U.S. yet the consumption of imported mandarins has also increased. The increased importation of Clementine mandarin fruit, which is the largest contributor to importation volume of mandarins from Spain, Morocco and other countries, has encouraged California growers to plant Clementine varieties and other mandarins. According to the California Agricultural Statistic Service (CASS), one of the field offices of the National Agricultural Statistical Services within the USDA, the total acreage of all mandarins and hybrids has increased from 10,094 acres in 1997 to 11,734 acres in 2001. Since 2001 there has

been a substantial increase in acreage of mandarin and mandarin hybrids above these levels. A summary of the 2003 data on mandarin and mandarin hybrid acreage will be released from the CASS in September of 2004 that will quantify this increase http://www.nass.usda.gov/ca. Most of the increases in acreage have occurred in Kern and Tulare counties.

NEW MANDARIN VARIETIES IN CALIFORNIA

The greatest increase in mandarin acreage in California is of Clementine varieties. Yet there are also increased plantings of "W. Murcott Afourer" (Afourer), and other mandarin and mandarin hybrids such as the newly released four UCR developed mandarins and mandarin hybrids called Gold Nugget™, Shasta Gold™, Tahoe Gold™ and Yosemite Gold™ .

CLEMENTINE VARIETIES

Internationally, the Clementine is one of the most popular groups of citrus varieties in the world. In the 2001 California Citrus Mutual Journal, Dave Gumpf, Robert Krueger and John Bash comprehensively reviewed the origin and characteristics of the different Clementine selections grown currently in California. Of the 16 Clementine varieties currently in California, Algerian Clementine was the most well known and widely grown selection in 2001. In the past few years increased plantings of "Nules" Clementine mandarin (also known as "Clemenules" or "De Nules") is now thought to be the variety of Clementine mandarin most planted in California. Depending upon where they are grown in California, Clementine varieties reach legal maturity between late September and November and are early season mandarins. Clementine varieties produce medium-sized trees, with a fine-textured appearance. The fruit are round to flattened on each end. The dark orange rind has a pebbled texture due to the presence of prominent oil glands and is fairly easy to peel. The flesh is bright orange, finely textured, and juicy. The flavor is sweet and very rich. As mentioned earlier, Clementine varieties (all except the variety "Monreal" which would be seedy in both single and mixed block plantings) are self-incompatible and must

TABLE 1 - Preliminary Pollination and Seediness Guide

Citrus Group	Varieties	Ability to serve as a pollen source to make fruit seedy	Low seeded or seedless grown in a mixed variety block planting with other varieties that serve as pollen source	Low seeded or seedless when grown in a single variety block planting
NAVEL ORANGES	Atwood	very low	yes	yes
	Fisher	very low	yes	yes
	Fukumoto	very low	yes	yes
	Beck	very low	yes	yes
	Washington (Parent)	very low	yes	yes
	Cara Cara	very low	yes	yes
	Lane Late	very low	yes	yes
	Powell	very low	yes	yes
	Chislett	very low	yes	yes
	Autumn Gold	very low	yes	yes
	Summer Gold	very low	yes	yes
	Barnfield	very low	yes	yes
VALENCIA ORANGES	Olinda	moderate	no	no
	Frost	moderate	no	no
	Delta	very low	yes	yes
	Midknight	very low	yes	yes
CLEMENTINE MANDARINS	Algerian	high	no	yes
	Fina Sodea	high	no	yes
	Marisol	high	no	yes
	Clemenules or Nules	high	no	yes
	Caffin	moderate	no	yes
	Oroval	moderate	no	yes
SATSUMA MANDARINS	Owari	very low	yes	yes
	Okitsu Wase	very low	yes	yes
	KunoWase	very low	yes	yes
OTHER MANDARINS AND HYBRIDS	W. Murcott Afourer	very high	no	yes
	Cold Nugget	very low	yes	yes
	Pixie	very low	yes	yes
	Seedless Kishu	very low	yes	yes
	IDE 2 Shasta Gold™ hybrid	low	yes	yes
	TDE 3 Tahoe Gold™ hybrid	low	yes	yes
	TDE 4 Yosemite Gold™ hybrid	low	yes	yes
	Nova	high	no	yes
	Page	moderate	no	yes
	Minneola	high	no	yes
	Fairchild	moderate	no	no
GRAPEFRUIT AND HYBRIDS	Star Ruby	very low	yes	yes
	Rio Red	low	yes	yes
	Marsh	low	yes	yes
	Oroblanco	low	yes	yes
LEMONS	Allen Eureka	moderate	no	no
	Frost Lisbon	moderate	no	no
	Limoneira 8A Lisbon	moderate	no	no
	Meyer	high	no	yes
PUMMELOS	Chandler	high	no	yes
	Reinking	high	no	yes

be grown in isolated single variety block plantings to be seedless. If cross-pollination occurs by a compatible variety such a "W. Murcott Afourer" or others (Table 1), the fruit will be seedy.

W. MURCOTT AFOURER OR AFOURER MANDARIN IMPORTED FROM MOROCCO

The mandarin variety "W. Murcott Afourer" (also called "Afourer") was first noticed by W.W. Bitters during his visit to the Kenistra Research Station hosted by El Bachir Nador in May of 1982. The friendship that developed on this trip and subsequent meetings led to importation of several citrus varieties including this one after a number of failed attempts. In July of 1985, the variety "W. Murcott, Afourer," PI 539533, was received for quarantine in Glenn Dale, Maryland, then was subsequently forwarded to the Citrus Clonal Protection Program. The name "W. Murcott, Afourer," came from Dr. Nador's assumption that this variety arose as an open pollinated seed of Murcott (Florida "Honey"), the coordinates for this experimental plot, "INRA W" and "Afourer" which was the name of the town nearby the station. "Afourer" also became the local name for this variety. AH original experimental plots of INRA W were pulled out due to excessive seed numbers in adjacent Clementines and "Ortanique" orchards. In California, the CCPP first released "W. Murcott, Afourer" from quarantine which allowed nurseries to buy bud-wood of this variety in January 1993.

It is known now based on the use of DNA markers in Mikeal Roose's lab-orabory at UC Riverside, that "W Murcott, Afourer" ("Afourer") is not the same as the variety "Murcott" which is sold as "Honey" in Florida. Fruit of "Murcott" and "Afourer" differ in shape, rind color and flavor. "Murcott" fruit are seedy in both mixed and single block plantings because the flowers are self-compatible. In contrast, "Afourer," like the Clementine varieties are self-incompatible. "Afourer" fruit will be seedless to low seeded when grown in isolated single block plantings, but seedy when the flowers are cross pollinated and it can be a very strong pollinizer for other mandarins such as Clementines. The tree is moderate in size and vigor and the fruit is usually flattened on each end with a thin, smooth, slightly orange rind that is easy to peel. The flesh is orange-colored and juicy, with a rich and sweet flavor. The fruit matures from late January to March depending on the locations and environment and holds on the tree very well.

GOLD NUGGET MANDARIN DEVELOPED AT UCR

In August of 1999, the UC Riverside Citrus Breeding Program directed by Mikeal Roose released a new seedless mandarin variety called "Gold Nugget." This UCR developed late season mandarin is a hybrid of "Wilking" x "Kincy" mandarins. The initial selection was made in 1975 by R. K. Soost and J. W. Camerons and during most of its evaluation it was called "Pixie-like" because of its similarities to the mandarin variety "Pixie." The current name, "Gold Nugget" reflects the external appearance of the fruit. Gold Nugget fruits are usually medium in size and only slightly flattened in shape with a somewhat bumpy rind. The aromatic rind is moderately easy to peel. The flesh of the fruit is bright orange and finely-textured. The fruit will be seedless when grown in either single or mixed variety block plantings, unlike Clementine varieties and "W. Murcott Afourer." The flavor of "Gold Nugget" fruit is rich and sweet. The fruit usually matures by early March, but holds exceptionally well on the tree, with summer-harvested fruit still being of good quality.

SHASTA GOLD™ (TDE2), TAHOE GOLD™ (TDE3), AND YOSEMITE GOLD™ (TDE4) MANDARIN HYBRIDS DEVELOPED AT UCR

The most recent releases from the UC Riverside Citrus Breeding Program are three complex mandarin hybrids. These new hybrids which are often collectively called "TDE" hybrids since it reflects the pedigree of these three hybrids which is [("Temple" tangor x 4n "Dancy" mandarin) x "Encore" mandarin]. In addition to the patented "TDE" names ("TDE2," "TDE3" and "TDE4"), each of these mandarin hybrids was given a trademark name as well: Shasta Gold™ (TDE2), Tahoe Gold™ (TDE3), and Yosemite Gold™ (TDE4).

All three produce seedless to very low seeded fruit with attractive dark orange rinds and a rich sweet flavor. These varieties will be seedless to very low seeded when grown in either a single or mixed variety plantings, unlike "W. Murcott Afourer" and the Qementine varieties. The trees of all three grow vigorously and are somewhat spreading in form. The three differ in a number of characteristics. Shasta Gold™ and Yosemite Gold™ produce large, "Mammoth" fruit with a moderately flat shape. Tahoe Gold™ fruit are medium-large "Jumbo" and the fruit are slightly flat in shape. Shasta Gold™ fruit are fairly easy to peel, have a smooth to slightly pitted rind texture with depressed oil glands and a deep orange color to the rind. Tahoe Gold™ fruit are moderately easy to peel and the rind is rather smooth to slightly grained with conspicuous oil glands and a very deep orange rind color. Yosemite Gold™, the easiest to peel has smooth rind with conspicuous oil glands and a very deep orange rind color.

Tahoe Gold™ fruit mature the earliest of the three, maturing between November and January depending on location. Shasta Gold™ and Yosemite Gold™ fruit mature slightly later with Shasta Gold™ maturing between December and March and Yosemite Gold™ maturing between December and January depending where they are grown. If you would like more information about these three varieties, a description of each is available on Mikeal Roose's web page (http://plantbiology.ucr.edu/peo-ple/faculty/roose.html) or there is a link to these descriptions on the Citrus Variety Collection web site: http://www.citrusvariety.ucr.edu

The availability of new mandarin and mandarin hybrid varieties with many favorable characteristics offers California growers new opportunities to compete on the global fresh citrus fruit market. Unlike Navel oranges, mandarins are more variable in their ability to produce seedless fruit. For those varieties that are self-incompatible, one needs to carefully select the planting site based on the proximity to potentially compatible pollen sources to ensure the production of seedless mandarins.

Title 3. Food and Agriculture
Division 3. Economics
Chapter 1. Fruit and Vegetable Standardization
Subchapter 4. Fresh Fruits, Nuts and Vegetables
Article 22. Citrus (Refs & Annos)

§ 1430.54. Definitions.
(a) "Protection Area" means the area within two miles of any registered seedless mandarin acreage in Madera, Fresno, Tulare or Kern County from March 1 through May 31.
(b) "Seedless Mandarin" means mandarin or tangerine varieties that do produce seeds when fertilized by pollen of the same plant or another plant of the same genotype.
(c) "Exempt Seedless Mandarin" means mandarin or tangerine varieties that do not produce seeds when fertilized by pollen of the same plant or another citrus plant.
(d) "Beekeeper" means every person that is the owner or is in possession of an apiary which is located within the state.
(e) "Bees" is defined as set forth in Section 29004, Food and Agricultural Code.
(f) "Apiary" is defined as set forth in Section 29002, Food and Agricultural Code.
(g) "Colony" is defined as set forth in Section 29006, Food and Agricultural Code.
(h) "Hive" is defined as set forth in Section 29011, Food and Agricultural Code.
(i) "Owner" means any person who owns seedless mandarin acreage within the Protection Area and includes a joint owner, operator, co-owner, guardian, executor, administrator, or any other person that holds property in a trust capacity under appointment of court.
(j) "Commissioner" is defined as set forth in Section 29008, Food and Agricultural Code.
Note: Authority cited: Sections 407, 29002, 29004, 29006, 29008, 29011 and 29812, Food and Agricultural Code. Reference: Sections 29810 and 29811, Food and Agricultural Code.

§ 1430.55. Voluntary Registration of Seedless Mandarin Acreage.
(a) An owner may annually register seedless mandarin acreage planted within the Protection Area with the commissioner of the county in which the acreage is located. Registration shall include acreage(s) by variety, total number of acres by variety, and number of trees by variety upon the adoption of this regulation, and between January 1 and January 31 of each year thereafter. An owner shall pay an annual registration fee of ten dollars ($10.00) per year to the commissioner for each registration in each county. Registration can be made for up to and including five years at a time. Registration updates (including but not limited to acreage, variety, and number of trees) can be made annually thereafter.
(b) An owner is responsible for updating, if necessary, the information provided in previous registrations upon the submission of a current annual registration.
(c) A commissioner may rely upon the most recent information provided by the owner in previous registrations unless it has been updated.
Note: Authority cited: Sections 407 and 29812, Food and Agricultural Code. Reference: Sections 29810 and 29811, Food and Agricultural Code.

§ 1430.56. Voluntary Release of Confidential Information by Beekeepers.
(a) A beekeeper may agree to a limited waiver of the confidentiality of information submitted to comply with apiary registration requirements set forth in Division 13, Chapter 1, Article 4 and Division 13, Chapter 1, Article 5 of the Food and Agricultural Code.
(b) The waiver shall limit the release of confidential apiary registration information to registered owners of seedless mandarin acreage within the county where the apiary has been registered.
(c) The waiver must be in writing, and accompany the apiary registration form, after the beekeeper has been informed, in writing, that the purpose of the waiver is to make confidential apiary registration information available to owners of seedless mandarin acreage.
(d) A commissioner shall only release information subject to the waiver upon request as follows:
(1) during each calendar year for a period commencing on March 1 and concluding on May 3; and
(2) to a owner who has registered seedless mandarin acreage within two miles of the registered apiary or apiaries.
Note: Authority cited: Sections 407, 29040, 29041, 29042, 29043, 29045, 29070, 29070.5 and 29812, Food and Agricultural Code. Reference: Sections 29810 and 29811, Food and Agricultural Code.

§ 1430.57. Dispute Resolution.
(a) The owner of registered seedless mandarin acreage may request that a registered beekeeper move an apiary to an alternative location provided by the owner if the apiary is located within two miles of the acreage. An owner may request that multiple apiaries be moved if they have been registered by the same beekeeper.
(b) Beekeepers of registered apiaries shall be available by telephone or other form of electronic verbal communication between 4 p.m. and 7 p.m., Monday through Saturday from March 1 through May 31 to receive requests from a registered seedless mandarin grower to move an apiary as provided in subsection (a).
(c) If agreement upon a new location of an apiary cannot be reached between the owner and the beekeeper, either may request, in writing, that the commissioner of the county in which the acreage and the apiary is located provide a recommendation as to whether the beekeeper should move the apiary to the alternative location. If the acreage and the apiary are located in different counties, the request may be directed to either the commissioner in the county in which the acreage is located or the commissioner in the county where the apiary is located. The party making the request shall also provide the commissioner with a summary of any attempts to resolve the dispute through negotiation. Requests can only bemade between March 1 and May 31 of any calendar year.
(d) The commissioner shall, within two business days after receiving the request, notify the owner and the beekeeper in writing that a request for a recommendation has been received.
(e) The owner and the beekeeper shall provide the commissioner, in writing, with their last offer, reasons for rejection of the other party's last offer, and an indication as to what they believe would be required to reach an agreement. The owner and the beekeeper shall

provide a written response that conforms to these requirements within four days of receipt of the notice.
(f) Upon receiving the request and the responses, the commissioner shall issue a recommendation that recommends either of the following

(a) the apiary shall not be moved;

(b) the apiary or a portion of the hives, as defined by the commissioner, shall be moved to a new location determined by the commissioner.

(g) The commissioner shall give pollination needs priority when issuing the recommendation.
(h) The owner and the beekeeper shall provide the commissioner witha fax number for the transmission of the recommendation. The commissioner shall deliver the recommendation to them by fax, with a confirmatory hard copy by mail, and it shall be deemed received upon electronic confirmation. The owner and the beekeeper may thereafter comply with the recommendation within 48 hours of receipt.
(i) The commissioner shall issue an advisory opinion within eleven (11) business days upon receipt of the request.
(j) The commissioner shall establish a cost not to exceed the cost of the program to issue the recommendation to be paid by the owner of seedless mandarin acreage to the commissioner.
Note: Authority cited: Sections 407 and 29812, Food and Agricultural Code. Reference: 407, 29810 and 29811, Food and Agricultural Code.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAY 27 2015

MEMORANDUM

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

SUBJECT: Posting EPA-HQ-OPP-2014-0818 to Regulations.gov for Public Access

FROM: Marietta Echeverria
Registration Division, Office of Pesticide Programs

Thru: Rick Keigwin
Director
Pesticide Re-Evaluation Division, Office of Pesticide Programs

This memorandum authorizes the posting of EPA-HQ-OPP-2014-0818 to Regulations.gov for public access.

EPA is seeking comment on a proposal to adopt mandatory pesticide label restrictions to protect managed bees under contract pollination services from foliar application of pesticides that are acutely toxic to bees on a contact exposure basis. These label restrictions would prohibit applications of pesticide products, which are acutely toxic to bees, during bloom when bees are known to be present under contract. EPA is also seeking comment on a proposal to rely on efforts made by states and tribes to reduce pesticide exposures through development of locally-based measures, specifically through managed pollinator protection plans. These plans would include local and customizable mitigation measures to address certain scenarios that can result in exposure to pollinators. EPA intends to monitor the success of these plans in deciding whether further label restrictions are warranted.

This document will be open for public comment for 30 days following the FR Notice publication on Friday, May 29, 2015.

Submit your comments, identified by Docket ID No. EPA-HQ-OPP-2014-0818, by one of the following methods:

- www.regulations.gov: Follow the on-line instructions for submitting comments.
- Mail: OPP Docket, Environmental Protection Agency, Mailcode 28221T, 1200 Pennsylvania Ave, NW, Washington, DC 20460.
- Hand Delivery: To make special arrangements for hand delivery or delivery of boxed information, please follow the instructions at *http://www.epa.gov/dockets/contacts.html*. Such deliveries are only accepted during the Docket's normal hours of operation.

EPA's policy is that all comments received will be included in the public docket without change and may be made available online at http://www.regulations.gov, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through http://www.regulations.gov or e-mail. The http://www.regulations.gov Web site is an ''anonymous access'' system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through http://www.regulations.gov, your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD–ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, avoid any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket, visit the EPA Docket Center homepage at http://www.epa.gov/epahome/dockets.htm.

EPA's Proposal to Mitigate Exposure to Bees from Acutely Toxic Pesticide Products

Table of Contents

1 Executive Summary

Today, EPA is proposing additional mandatory pesticide label restrictions to protect managed bees under contract pollination services from foliar applications of pesticides that are acutely toxic to bees on a contact exposure basis. These restrictions would prohibit applications of pesticide products, which are acutely toxic to bees, during bloom where bees are known to be present under contract; these restrictions will apply to most insecticides and some herbicides. Today's proposed requirements would not supersede existing, more restrictive product use specifications.

EPA is also encouraging the efforts currently made by states and tribes to reduce pesticide exposures through development of locally-based measures. Specifically, EPA has been working with its state and tribal partners to develop Managed Pollinator Protection Plans (MP^3s). Such plans were discussed in the June 2014, Presidential Memorandum[1] (the Memorandum or directive) and the National Strategy to Promote the Health of Honey Bees and Other Pollinators[2] (the Strategy)which identifies public/private partnerships as one means of addressing pollinator declines. These MP^3s would include local and customizable mitigation measures to address certain scenarios that can result in exposure to pollinators. EPA will monitor the success of these plans in deciding whether further label restrictions are warranted.

Today's proposal addresses only acute exposure to pesticides from foliar applications under specific conditions. While the proposed mitigation focuses on managed bees under contract pollination services, EPA believes that in protecting managed bees in these circumstance, these measures would also protect native solitary and social bees that are also in and around treatment areas. Moreover, EPA recognizes there are concerns associated with potential exposure to chemicals that are not classified as acutely toxic by contact, including chemicals used in combination which may result in enhanced toxicity, and crops which incorporate pesticide residues in pollen/nectar. Future EPA actions will address these situations. EPA will continue to conduct chemical-specific risk assessments for bees and will consider additional product-specific mitigation as needed in the Office of Pesticide Program's (OPP's) registration and registration review programs.

Today's proposal, as well as EPA's support for development of state and tribal MP^3s, is consistent with the President's directive and the National Strategy to Promote the Health of Honey Bees and Other Pollinators, which addresses the multiple factors affecting honey bees and pollinator health. The Strategy explains the need to expand federal efforts to reverse pollinator losses and calls for the development of new public-private partnerships across various sectors (state, tribal and local governments, industry, and non-governmental organizations) to reverse pollinator losses and restore populations to healthy levels.

[1] White House. 2014. Presidential Memorandum Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators. Memorandum for Heads of Executive Departments and Agencies. June 20, 2014. http://www.whitehouse.gov/the-press-office/2014/06/20/presidential-memorandum-creating-federal-strategy-promote-health-honey-b

[2] White House. 2015. National Strategy to Promote the Health of Honey Bees and Other Pollinators. May 19, 2015. https://www.whitehouse.gov/sites/default/files/microsites/ostp/Pollinator%20Health%20Strategy%202015.pdf

2 Background

EPA has taken steps, starting with the development of improved scientific tools to assess risks, to manage potential risks from pesticides to pollinators. EPA has routinely required toxicity tests with honey bees and has used these data as a surrogate for assessing risks to terrestrial invertebrates in general. In recent years there has been increasing uncertainty regarding whether these acute toxicity data are adequate to evaluate the role that pesticides play in pollinator declines. Consequently, EPA began to explore whether a broader suite of studies was needed to evaluate potential risks to bees. In response, EPA, Health Canada's Pest Management Regulatory Agency (PMRA), and the California Department of Pesticide Regulation (CDPR) developed a harmonized risk assessment framework that was presented to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Scientific Advisory Panel (SAP) in 2012[3]. After considering the SAP's advice, the EPA now has formalized its scientific process for quantifying potential risks to bees[4]. Data required for the risk assessment framework informs EPA risk assessors of the potential for adverse effects to individual bees, as well as bee colonies, from exposure that may result from the labeled use of a pesticide. This framework is now an integral part of the registration and registration review programs. Laboratory and field-based tests are also being developed for additional species of solitary and social bees[5] [6].

Pesticide labels have routinely included bee advisory statements as outlined in 40 CFR 156.85(b)(5)[7] and the Label Review Manual[8] based on data from acute contact toxicity tests (*e.g.*, OCSPP Guideline 850.3020[9]) and studies on the toxicity of residues on foliage (OCSPP Test Guideline 850.3030[10]) using honey bees. The Directions for Use sections of the label of some products have also included more specific restrictions to protect pollinators, based on EPA's analysis of potential exposure and effects of the particular pesticide. However, stakeholders have continued to emphasize the need for greater clarity and stronger protections[11] [12].

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[3] USEPA. 2012. White Paper in Support of the Proposed Risk Assessment Process for Bees. Submitted to the FIFRA Scientific Advisory Panel for Review and Comment September 11 – 14, 2012. Office of Chemical Safety and Pollution Prevention Office of Pesticide Programs Environmental Fate and Effects Division, Environmental Protection Agency, Washington DC; Environmental Assessment Directorate, Pest Management Regulatory Agency, Health Canada, Ottawa, CN; California Department of Pesticide Regulation http://www.epa.gov/oppfead1/cb/csb_page/updates/2012/sapmtg-sept.html

[4] USEPA. 2014*a*. Guidance for Assessing Pesticide Risks to Bees. Office of Pesticide Programs United States Environmental Protection Agency, Health Canada Pest Management Regulatory Agency, California Department of Pesticide Regulation. June 19, 2014. http://www2.epa.gov/sites/production/files/2014-06/documents/pollinator_risk_assessment_guidance_06_19_14.pdf

[5] ICP-PR. 2012. Proceedings of the 11th International Symposium on the International Commission for Plant-Pollinator Relationships (ICP-PR) Bee Protection Group. Wageningen, Netherlands, November 2 – 4, 2011. Published in P.A. Oomen and H. Thompson eds, Julius Kühn Archiv 437.

[6] ICP-PR. Proceedings of the International Commission for Plant-Pollinator Relationships (ICP-PR) Bee Protection Group 12th International Symposium Hazards on Pesticides to Bees. Ghent, Belgium. September 15 – 17, 2014. In preparation

[7] CFR. 2014. Code of Federal Regulations. Title 40 (Protection of Environment), Chapter 1 (Environmental Protection Agency) Subchapter E (Pesticide Programs) Part 156 (Labeling Requirements for Pesticides and Devices) Subpart E (Environmental Hazard and Precautionary Statements) §156.85 (Non-target organisms) http://www.ecfr.gov/cgi-bin/text-idx?SID=511673be0c81c693acae95773c696225&node=se40.24.156_185&rgn=div8

[8] USEPA. 2012. Label Review Manual. http://www.epa.gov/oppfead1/labeling/lrm/

[9] USEPA. 2012*a*. Ecological Effects Test Guidelines. OCSPP 850.3020 Honey Bee Acute Contact Toxicity. EPA 712-C-019. January 2012. http://www.epa.gov/ocspp/pubs/frs/publications/Test_Guidelines/series850.htm

[10] USEPA. 2012*b*. Ecological Effects Test Guidelines OCSPP 850.3030 Honey Bee Toxicity of Residues on Foliage. EPA 712-C-018. January 2012. http://www.epa.gov/ocspp/pubs/frs/publications/Test_Guidelines/series850.htm

[11] USDA. 2013*b*. Report on the National Stakeholders Conference on Honey Bee Health. National Honey Bee Health Stakeholder Conference Steering Committee. October 17 – 17, 2012. http://www.usda.gov/documents/ReportHoneyBeeHealth.pdf

[12] *Ibid* USEPA 2014*b*

In August 2013, EPA developed new label language for certain neonicotinoid insecticides[13] in response to concerns from various stakeholder groups that these compounds represented a particular hazard to managed bees. At that time, EPA recognized that different exposure scenarios following foliar applications of the neonicotinoid pesticides warranted different degrees of mitigation. In one scenario (Scenario 1), large numbers of managed bees may be directly exposed to pesticide spray because they have been intentionally placed within or adjacent to the area being treated (*i.e.,* under a contract to pollinate a crop). In a second scenario (Scenario 2), managed bees may be directly exposed to pesticide spray via off-site pesticide drift, or because the bees are within forage range of the application area.

The label language developed[14] for the neonicotinoid pesticides reflected the likelihood of different exposures for managed bees in Scenario 1 and Scenario 2. Given the intentional placement of colonies into or adjacent to the application area, the managed bees under contract pollination services (Scenario 1) are nearly certain to be exposed if an application is made. Consequently, to protect managed bees under contract pollination services at the application site, EPA prohibited application of neonicotinoid products while bees are foraging and until flowering is complete with the single exception of 48-hour notification to the beekeepers prior to foliar applications. For managed bees not under contract pollination services (Scenario 2), EPA prohibited application while bees are foraging and until flowering is complete but with more exceptions to enable growers and beekeepers to reduce potential exposure to bees while affording growers some flexibility to apply pesticides for crop protection. EPA concluded, consistent with the statutory mandate under FIFRA[15], that these modifications of the neonicotinoid labels reduced the risks to bees in a manner that improved the overall balance of risks and benefits from using these pesticides.

Following issuance of the August 2013 letter[16] directing label changes for neonicotinoid products, EPA announced its intention to follow a similar approach with other pesticides that are applied to the foliar surfaces of plants and are acutely toxic to bees on contact, *i.e.,* those pesticides with an acutely lethal dose to 50% of the bees tested (abbreviated LD_{50}) of less than 11 micrograms per bee (<11 µg/bee), based on either the acute contact toxicity test following OCSPP Guideline 850.3020[17] or its equivalent test in Europe (*i.e*., OECD 214[18]). These acute toxicity data, which have been routinely required for pesticides, are frequently corroborated with bee kill incident data reported to EPA. The use of incident

[13] Neonicotinoids are a class of insecticides with a common mode of action that affects the central nervous system of insects, causing paralysis and death.
[14] USEPA. 2014*c*. New Labeling for Neonicotinoid Pesticides. http://www2.epa.gov/pollinator-protection/new-labeling-neonicotinoid-pesticides
[15] The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) provides federal control of pesticide distribution, sale and use. All pesticides used in the United States must be registered (licensed) by EPA. For more information, see: http://www.epa.gov/agriculture/lfra.html
[16] USEPA. 2013*c*. Memorandum to Registrants of Neonicotinoid Products on Pollinator Protection Labeling for nitroguanidine neonicotinoid products. http://www2.epa.gov/sites/production/files/2013-11/documents/bee-label-info-ltr.pdf
[17] *Ibid* USEPA. 2012*a*.
[18] OECD. 1998. OECD Guidelines for the Testing of Chemicals. Test Number 214, Acute Contact Toxicity Test. http://www.oecd-ilibrary.org/environment/test-no-214-honey bees-acute-contact-toxicity-test_9789264070189-en;jsessionid=43gvto47wnue9.delta

data as a line of evidence in evaluating the potential risks associated with pesticides is discussed in associated guidance documents[19] [20] [21] [22].

3 Problem Statement

Pesticides, particularly those intended to control insect pests, can harm bees. Pesticides have also been identified as one among multiple factors negatively impacting pollinator health, including declines in honey bees specifically[23] [24]. Through discussions with various stakeholders and based on reported bee kill incidents contained within the EPA Incident Data System (IDS) and the Ecological Incident Information System (EIIS) databases for a large number of pesticides that have been classified as moderately or highly toxic to bees on an acute exposure basis, EPA has concluded that additional measures would provide better protection for bees from acute contact exposures. EPA is also aware that there are often inadequate relationships and a lack of suitable communication mechanisms in place at the local level between and among beekeepers, growers, and pesticide applicators to assure that pesticides needed to protect crops can be applied in ways that are not harmful to bees. Therefore, clearer and more consistent mandatory label restrictions could reduce the potential exposure to bees from pesticides categorized as acutely toxic to bees, *i.e.*, those compounds with an acute contact LD_{50}<11 µg/bee, in situations where large numbers of managed bees are intentionally positioned under contract in or close to pesticide application sites. In addition, EPA believes that state and tribal managed pollinator protection plans provide a means of developing localized and customized mitigation measures to reduce exposure of bees to pesticides in certain scenarios.

4 Desired State

A common theme from discussions about pesticides and pollinators with one of EPA's federal advisory committees, the Pesticide Program Dialogue Committee (PPDC)[25], and with other stakeholder groups[26] has been the need for clearer communications between growers/applicators, beekeepers and enforcement authorities. Stakeholders have indicated that more direct lines of communication are

[19] USEPA 2011. Memorandum from Donald J. Brady, Director on Guidance for Using Incident Data in Evaluating Listed and Non-listed Species under Registration Review. http://www.epa.gov/pesticides/science/efed/policy_guidance/team_authors/terrestrial_biology_tech_team/honeybee_data_interim_guidance.pdf

[20] *Ibid* USEPA 2004

[21] *Ibid* USEPA 2012

[22] *Ibid* USEPA 2014*a*

[23] *Ibid* USDA 2013

[24] vanEngelsdorp, D., J. D. Evans, C. Saegerman, C. Mullin, E. Haubruge, B. K, Nguyen, M. Frazier, J. Frazier, D. Cox-Foster, Y. Chen, R. Underwood, D. R. Tarpy, J. S. Pettis. 2009. Colony Collapse Disorder: A Descriptive Study. PLoSONE 4(8): e6481. Doi:10.1371/journal.pone.0006481 http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0006481

[25] A description of the USEPA Pesticide Program Dialogue Committee Pollinator Protection Workgroup can be found at http://www2.epa.gov/pesticide-advisory-committees-and-regulatory-partners/pesticide-program-dialogue-committee

[26] *Ibid* USDA. 2013*b*.

needed at the local level. Groups such as the State FIFRA Issues Research and Evaluation Group (SFIREG[27]) have echoed these concerns.

As directed by the Presidential Memorandum and described in the Strategy, EPA is working with states and tribes to increase the communication among all local stakeholders that have a part in protecting bees from exposure to pesticides and to promote implementation of integrated pest management (IPM[28]). The EPA sees collaboration on Managed Pollinator Protection Plans (MP^3s) as a means to enhance communication and risk mitigation. The purpose of an MP^3 with respect to pesticide use is to utilize local expertise to identify customizable solutions to effectively mitigate risk from acutely toxic pesticides to managed bees[29].

EPA is aware of concerns that approaches to assess and mitigate risk to managed honey bees may not be protective of unmanaged bees (*i.e.*, "native" or "wild" bees). EPA's ecological risk assessment framework documents[30] [31] [32], discuss the uncertainties associated with the use of surrogate species (*e.g.*, the use of the honey bee) for determining the potential for adverse effects to untested insect pollinator species as a result of exposure to pesticides. Using the honey bee as a surrogate species is consistent with both its established use in risk assessment and the currently available science. EPA believes that the approach taken to protect managed honey bees will also decrease the risks to wild bees since pesticides are generally likely to affect wild bees and managed bees in a similar manner. Moreover, EPA believes that additional measures to protect managed bees will provide protections to other pollinators as well. For example, measures designed to ensure that applications are only made when managed bees are not likely to be foraging will also be effective for other pollinators with similar foraging behavior and will reduce potential exposure to wild bees as well. This effort is also consistent with the Presidential directive and the Strategy which seeks to promote the health of honey bees and other pollinators to "*ensure the sustainability of our food production systems, avoid additional economic impact on the agricultural sector and protect the health of the environment*."[33]

[27] The State FIFRA Issues Research and Evaluation Group (SFIREG) is comprised of State, Federal, Tribal and Association representatives, and meets periodically to identify and discuss issues related to pesticides that affect the states/tribes. A description of SFIREG can be found at the following link: http://www.aapco.org/sfireg.html

[28] Integrated Pest Management (IPM) programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information in combination with available pest control methods, is used to manage pest damage by the most economical means while minimizing potential hazards to people, property and the environment.

[29] Managed bees include those for purposes of pollination services and honey production (i.e., honey bees, bumble bees, alfalfa leaf cutters, and blue orchard bees). Managed bees may be managed by hobbyists or commercial beekeepers.

[30] *Ibid* USEPA 2004

[31] *Ibid* USEPA 2012

[32] *Ibid* USEPA 2014*a*

[33] *Ibid* White House. 2014

Over the last few years, several states, such as California[34] [35], Colorado[36], Florida[37], Mississippi[38], North Dakota[39] and others, have independently developed state-specific pollinator protection plans to enhance communication between stakeholders (*e.g.*, beekeepers, growers, applicators) which in turn is intended to reduce the potential exposure to bees from pesticides. In some cases, states have completed rule-making (*e.g.*, Iowa[40] and California[41]) which has established mandatory mitigation measures where beekeepers must be notified in advance of applications or applications may not take place during times when bees are likely to be foraging on the treated crop. These states have developed these plans in response to the needs of the growers and beekeepers of their states. The plans are aimed at identifying measures to mitigate potential exposure to bees from pesticides while providing flexibility to growers and beekeepers. A common element of each of the plans has been that they are founded on stakeholder engagement and consensus building; therefore, the state pollinator plans foster communication and collaboration between growers and the beekeepers. Feedback from state lead agencies, which have developed pollinator protection plans, indicates that the plans have been effective in increasing communication and mitigating risk. This result is evident from decreased numbers of bee kill incident reports, an increase in the number of bee hives registered in apiary registries, and an increased number of requests for advice when landowners cannot reach beekeepers. Although there are areas of commonality in the state-specific plans, they take many different approaches, since each reflects local conditions and local solutions.

One element of the Strategy is for EPA to engage with states and tribes and others on the development of pollinator protection plans. EPA's initial discussions about pollinator protection plans have been with co-regulators through the SFIREG, the Association of American Pesticide Control Officials (AAPCO[42]) and the Tribal Pesticide Program Council (TPPC). These discussions have led to the realization that additional guidance is needed for states and tribes in the development of such plans, and state lead agencies are developing such guidance. As discussed in section 5.3.1, a draft guidance document has been circulated for wider review by states and will be made available following incorporation of their feedback.

5 Proposed Mitigation Approach and Rationale

EPA is proposing label changes to provide additional protections to managed bees under contract pollination services and is encouraging local solutions in the form of state and tribal MP^{3}s for managed

[34] California Department of Food and Agriculture. 2014. Bee and Beehive Information. http://www.cdfa.ca.gov/plant/PE/interiorexclusion/bees.html

[35] California Food and Agricultural Code Section 29040-29056 http://www.leginfo.ca.gov/cgi-bin/displaycode?section=fac&group=29001-30000&file=29040-29056

[36] Colorado Environmental Pesticide Education Program. Pollinator Protection 2013. http://www.cepep.colostate.edu/Pollinator%20Protection/index.html

[37] Florida Department of Agriculture and Consumer Services. 2014. Florida Bee Protection. http://www.freshfromflorida.com/Divisions-Offices/Agricultural-Environmental-Services/Consumer-Resources/Florida-Bee-Protection

[38] Mississippi Honeybee Stewardship Program. 2014 http://www.msfb.org/public_policy/Resource%20pdfs/Bee%20Brochure.pdf

[39] North Dakota Department of Agriculture. 2014. North Dakota Pollinator Plant. A North Dakota Department of Agriculture Publication. http://www.nd.gov/ndda/files/resource/NorthDakotaPollinatorPlan2014.pdf

[40] Iowa Department of Agriculture. Advancing Iowa's Agricultural Interests. See Iowa Administrative Code Chapter 21-45.31(206). http://www.iowaagriculture.gov/horticulture_and_farmersmarkets/sensitivecropdirectory.asp

[41] California Department of Pesticide Regulation. Food and Agriculture Code Section 29040-29056. http://www.leginfo.ca.gov/cgi-bin/displaycode?section=fac&group=29001-30000&file=29040-29056

[42] APPCO. 2014. Association of American Pesticide Control Officials. http://www.aapco.org/

bees not under contract services. EPA will work with state and tribal lead agencies to facilitate adoption of and compliance with MP^{3}s that reflect public stakeholder processes. EPA will monitor the success of these plans in mitigating risk to bees from acutely toxic pesticides on an ongoing basis and determine whether additional EPA action is warranted. In the following section, the scope of these changes is discussed.

5.1 General Approach

EPA continues to believe that bees are likely to be exposed from application of acutely toxic pesticides, although the certainty such exposure will occur differs in ways that warrant different approaches to risk mitigation. When managed bees are on site under contract to pollinate the crop, which can also be the application area, relatively large numbers of bees are intentionally placed in or near the crop area, *i.e.*, managed bees are a direct input to the production of the crop. Consequently, large numbers of bees are likely to be directly exposed to pesticide spray during a pesticide application. Underscoring the potential magnitude of colonies that may be present at an application site requiring contracted pollination services, the EIIS database contains reports from commercial beekeepers of adverse effects to roughly 20,000 colonies contracted to support pollination services in almonds and roughly 2,000 colonies contracted to support pollination services in blueberries purportedly due to pesticide applications made while large numbers of colonies were in or near treatment areas in 2014 alone. In addition, EPA has heard claims of tens of thousands more colonies in almonds and blueberries being affected in 2014. (EPA notes, however, that it is not clear whether these adverse effects were acute or chronic with respect to the timing of pesticide applications relative to when bees may have been actively foraging, since those incidents have not been formally reported to EPA and/or investigated by state lead agencies responsible for enforcing compliance with pesticide label restrictions.) Although the EIIS contains numerous bee kill incident reports from beekeepers who were not providing contracted pollinations services at the time of the incident, those individual reports have not been of similar magnitude (*i.e.*, simultaneously impacting thousands of hives) as those reported by commercial beekeepers providing contracted pollinator services

When managed bees are not providing pollination services at a site that is being treated with a pesticide, they may still be directly exposed because the application site is within forage range of those bees. In such circumstances, EPA considers the likelihood of exposure to large numbers of managed bees to be somewhat lower since large numbers of colonies are not intentionally placed within or near the treatment area. EPA believes that the likelihood of exposure between the two scenarios is significantly different and that, given their proximity to the treated crop, large numbers of managed bees under contract pollination services are nearly certain to be exposed and potentially adversely affected if an application with an acutely toxic pesticide is made. Further, in evaluating these two scenarios (where bees are brought on site under contract vs. when bees may be present but the grower may not derive a benefit from the presence of bees on his or her property), EPA believes it is also appropriate to consider the benefit or lack of benefit that bees are providing to the grower in determining the nature and scope of mitigation. Consequently, EPA is proposing different mitigation approaches for these two scenarios; however, EPA will continue to evaluate the efficacy of these efforts to determine whether additional action is needed.

The proposed restrictions outlined in the following sections would not replace more restrictive chemical-specific, bee-protective provisions (*e.g.*, pre-bloom restrictions) that may already be on a product label. For example, based on chemical-specific assessment, EPA may have determined that the persistence of toxic residues in pollen and nectar requires that an application be prohibited for a period of time prior to bloom, in addition to prohibitions during bloom, in order to ensure that residues in pollen and nectar be below levels of concern when bees are likely to be exposed (*i.e.*, a pre-bloom restriction). These more restrictive prohibitions would not be superseded by the proposed mitigation described below. As discussed previously, EPA will continue to conduct comprehensive chemical-specific risk evaluations and take appropriate action to further mitigate identified risks through the registration and registration review programs based on the available science.

5.2 Application to sites with bees present under contract for pollination services

As discussed above, contracted pollination services result in a heightened exposure potential where a large number of honey bee colonies are intentionally placed at a use site, and the application of a toxic pesticide in this scenario is nearly certain to result in adverse effects to pollinators. Although the likely outcomes are counter-productive for both the beekeeper (loss of honey bee stock) and the grower (diminished pollination services), many beekeepers and growers have not found ways to avoid such outcomes. Consequently, EPA believes that strong regulatory measures should be in place for the contracted service scenario to mitigate these potential problems. Therefore, EPA proposes the following:

- To prohibit the foliar application of acutely toxic products during bloom for sites with bees on-site under contract, unless the application is made in accordance with a government-declared public health response. (See proposed label language in **Appendix B**.)

There would be no other exceptions to the bloom prohibition in the contracted-services scenario. Current neonicotinoid product labels include a 48-hr notification exception to the bloom prohibition. However, as part of this mitigation proposal, the 48-hr notification exception for crops under contracted pollination services during bloom for all neonicotinoid product labels would be removed.

The proposed mitigation applies to all products (FIFRA Section 3 and 24(c) Special Local Need registrations and where applicable Section 18 emergency exemption petitions*) that have:

(1) liquid or dust formulations as applied; and,

(2) foliar use directions for use on agricultural crops with bees onsite under contract for pollination services; and,

(3) active ingredient(s) that have been determined via testing to have an acute contact toxicity value less than 11 micrograms per bee (LD_{50}<11 µg/bee). The active ingredients that meet this criterion are listed in Appendix A. EPA will also consider as a line of evidence those active ingredients that have resulted in bee kill incidents that were investigated and determined to result from the proper use (*i.e.*, were not the result of a misuse) of a product.

*depending on the nature of the emergency for which a Section 18 petition has been submitted, the at-bloom restriction may not apply. This determination will be reached on a case-by-case evaluation.

The mitigation measures proposed for when bees are present under contract pollination would not apply to applications made in support of public health such as use for wide area mosquito control. EPA recognizes that a wide area mosquito control application can impact large numbers of bees if the application co-occurs in areas with pollinator-attractive plants; however, such applications utilizing products classified as acutely toxic to bees are used to protect public health through mosquito abatement.

Also, EPA encourages pollination service contracts established between growers and beekeepers that take into account the increased likelihood of bee colony exposure by including provisions to ensure that colonies will be protected and pollination services secured. If EPA receives evidence during the public comment period and/or through outreach at stakeholder meetings that such contract provisions are common or that there are other effective and mutually agreed upon stakeholder (*i.e.*, beekeeper-to-grower) practices indicating that application of acutely toxic pesticides is not of risk concern for bees under contract, then EPA will consider this evidence in determining whether this scenario needs the mitigation indicated in the proposed language.

5.3 Application to sites that are not under contracted pollination services

EPA believes that managed bees not under contracted services (and other unmanaged bees) may also be exposed to acutely toxic pesticides when they are within forage range of the application site. While pesticide exposure under this scenario is possible, it is less certain than in situations where a pesticide is applied to a site when large numbers of managed bees have intentionally been positioned at the site for the purposes of providing pollination services. EPA believes that the lower likelihood of exposure for large numbers of managed bees in this scenario may warrant, in the future, a more flexible approach toward mitigation such as that afforded by state or tribal Managed Pollinator Protection Plans (MP^3s). Further, feedback provided by multiple stakeholders (including growers, applicators, beekeepers, and state lead agencies) indicates that there is a wide range of local conditions which militate against a single regulatory approach to providing protections for non-contracted managed bees. Many, however, have recognized that the success of pollinator protection efforts will depend on clear communication among affected stakeholders to design effective, localized approaches.

Accordingly, EPA will encourage states and tribes to develop MP^3s that are effective in reducing the likelihood of bees being present in the treatment area at the time a pesticide application is to be made. EPA will work with state and tribal lead agencies to facilitate adoption of and compliance with MP^3s that reflect local agronomic practices. This can be best achieved through state or tribal MP^3s which results from a public stakeholder process. EPA will monitor success of these MP^3s in mitigating risk to bees from acutely toxic pesticides on an ongoing basis and determine whether additional EPA action is warranted. Therefore, for managed bees not under contact pollination services, no further changes to product labels, including the neonicotinoid pesticides, are proposed at this time.

5.3.1 State and Tribal Managed Pollinator Protection Plans (MP^3s)

Through discussions with the PPDC, AAPCO, and SFIREG, EPA recognizes that several states (*e.g.*, California[43] [44], Colorado[45], Florida[46], Mississippi[47], and North Dakota[48]) have developed MP^3s by productively engaging stakeholders within their respective states. These plans serve as examples of effective collaboration between stakeholders at the local level that can lead to broader awareness of needs and increased cooperation between stakeholders to reduce pesticide exposure for bees while maintaining the flexibility to protect crops. The common element in these plans has been the increased communication between stakeholders, and anecdotal reports from the stakeholder groups suggest that the plans are effective at increasing communication and cooperation.

The EPA is generally promoting the development of state and tribal MP^3s that cover use of acutely toxic pesticides sites where there are no bees onsite under contract pollination services; however, the scope of such plans is not limited to a specific scenario. States and tribes have the flexibility to determine the scope of an MP^3 that best responds to pollinator issues in their region. For example, the scope could include applications to crops, and commercial applications to ornamentals in commercial, public, and residential settings, and other scenarios.

SFIREG has drafted guidance for states to consider in developing MP^3s, which identifies several elements for establishing a framework for communication and cooperation between beekeepers and growers and reducing pesticide exposure for managed bees. Tribes are also encouraged to consider this guidance in developing their own MP^3s, as appropriate. In general, these elements include a public stakeholder participation process for the development of a MP^3 to encourage local solutions based on improved communication and cooperation; a method for growers/applicators to know if there are managed bees near treatment sites, and to identify and contact beekeepers prior to application that will enable the grower/applicator to communicate about any planned treatments and how best to protect the colonies; inclusion of best management practices that both the grower/applicator and beekeeper can undertake to limit exposure of the managed bees to the proposed pesticide application; a clear defined plan for public outreach to promote robust adoption of the plan; a process to periodically review and modify the plan as needed; and a mechanism to measure the effectiveness of the managed pollinator protection plan. In addition, other recommendations are included in the guidance document for consideration in developing MP^3s. This draft guidance document has been circulated by SFIREG for wider review by states and is, therefore, subject to change. The final guidance document is expected to be made available following incorporation of their feedback.

While EPA's proposed label statement would address risks to managed bees present at a site under contract for pollination services, state and tribal MP^3s may address pesticide-related risks to all pollinators, including managed bees, whether or not they are present under a contract, as well as wild pollinators. As noted earlier though, the scope of state and tribal MP^3s is not limited to a particular

[43] California Department of Food and Agriculture. 2014. Bee and Beehive Information. http://www.cdfa.ca.gov/plant/pollinators/index.html
[44] California Food and Agricultural Code Section 29040-29056 http://www.leginfo.ca.gov/cgi-bin/displaycode?section=fac&group=29001-30000&file=29040-29056
[45] Colorado Environmental Pesticide Education Program. Pollinator Protection 2013. http://www.cepep.colostate.edu/Pollinator%20Protection/index.html
[46] *Ibid* Florida Department of Agriculture and Consumer Services. 2014.
[47] *Ibid* Mississippi Honeybee Stewardship Program. 2014.
[48] *Ibid* North Dakota Department of Agriculture. 2014.

scenario for managed bees nor would such plans be limited to agricultural practices but could extend to a broader number of pollinating species and habitats. EPA has worked collaboratively with the U.S. Department of Agriculture and Michigan State University, as well as consulted published sources[49] [50] [51], to identify plants that are pollinator attractive and which require managed pollination services. The list of pollinator-attractive plants is based in part on those plants contained in the European Food Safety Authority (EFSA) guidance for assessing risks of pesticides to bees[52]; however, USDA has included a broader number of plant species in its assessment and has provided references to support the attractiveness classification. Based on the list, most crops categorized as attractive to native bees are attractive to honey bees as well; EPA recognizes that there are exceptions (*e.g.*, tomatoes). States and tribes are encouraged to consider this list of pollinator-attractive plants when it becomes available for developing their MP^{3}s.

6 Uncertainties

While the intent of the proposed label changes and state and tribal MP^{3}s is to reduce exposure of managed bees to pesticides that are acutely toxic on contact, uncertainties remain regarding chemicals that may not fall within the domain of the proposal. These uncertainties are discussed below.

6.1 Non-acutely toxic insecticides and insect growth regulators

EPA recognizes that in addition to causing acute lethal effects, pesticides may cause sublethal chronic effects and effects to insect pollinators at various life stages and at various levels of biological organization (individual and colony-level). Specifically, non-acutely toxic insecticides such as insect growth regulators (IGRs) generally target early developmental stages (*e.g.*, larvae, pupae) and have varying degrees of specificity to target pest species. The determination of whether or not a specific IGR will have activity on honey bees and non-*Apis* pollinator species needs to be made on a chemical-specific basis. For example, EPA has a full suite of effects data for methoxyfenozide, a chemical which mimics the molting hormone ecdysone, and these data show that the chemical does not adversely affect larval and adult honey bees, either at the individual level or at the whole colony level. However, there are preliminary data for other IGRs (*e.g.*, diflubenzuron) which suggest possible adverse effects to honey bee larval and pupal development. As discussed previously, to address these concerns, EPA will continue to require a suite of effects and residue studies, conduct comprehensive chemical-specific risk evaluations according to the *Guidance for Assessing Pesticide Risks to Bees*,[53] and take appropriate action to further mitigate identified risks through the registration and registration review programs based on the available science.

[49] McGregor SE, 1976. Insect pollination of cultivated crop plants. Agricultural Handbook No. 496. Ed USDA Agricultural Research Service W, D.C, USA.
[50] Free JB. 1993. Insect Pollination of crops, 2nd edn. Academic Press: London, UK.
[51] Delaplane, K. S. & Mayer, D. F. (2000). Crop Pollination by Bees. – New York, Oxon (CABI Publishing).
[52] European Food Safety Authority, 2013. EFSA Guidance Document on the risk assessment of plant protection products on bees (*Apis mellifera*, *Bombus* spp. and solitary bees). Appendix D. EFSA Journal 2013; 11(7):3295, 266 pp., doi: 10.2903/j.efsa.2013.3295.
[53] *Ibid* USEPA 2014

6.2 Insect Growth Regulators and Fungicide Tank Mixes

EPA is also aware of concerns regarding the potential effects to honey bee larvae and queen development reported in connection with bee incidents following tank mixed applications of certain fungicides with insecticides (including IGRs that are not acutely toxic to adult bees). Field reports from beekeepers allege that applications of these tank mixes during almond bloom are having colony-level effects. However, there are also beekeepers reporting little to no effects on bees located close to the sites of tank-mixed applications in question. Additionally, EPA is aware of research that is being conducted to quantify the level of interaction between some IGRs and some fungicides[54] [55]. The research to date is limited and specific to diflubenzuron (Dimilin®) and a subset of fungicides (*e.g.*, boscalid and pyraclostrobin (Pristine®)), but this research has shown no synergistic effects at environmentally relevant concentrations. Additional research to evaluate the interaction between Dimilin® and other fungicides (*e.g.*, propiconazole, Tilt® and iprodione, Roval®) and other IGRs (*e.g.*, methoxyfenozide, Intrepid®) at environmentally relevant concentrations is underway[56]. EPA will continue to evaluate the open literature as part of the registration and registration review programs and may require additional testing on specific IGR-fungicide combinations to address specific uncertainties identified in the open literature and through reported incidents. Additionally, EPA requests that additional scientific information regarding the effects of tank-mixed IGRs and fungicides be submitted in response to this proposal.

6.3 Systemic Pesticides and Prolonged Residual Toxicity

EPA recognizes the concern surrounding systemic pesticides and those with prolonged residual toxicity. Systemic pesticides that have prolonged residual toxicity may not be adequately addressed by the proposed mitigation discussed in this proposal. When applied using methods other than foliar treatments (*e.g.,* soil, seed treatment, and tree injection applications), systemic pesticides and/or pesticides with prolonged residual toxicity may result in residues in pollen and nectar at levels that can impact bees and hive health. However, the likelihood of this occurring is highly dependent on the specific properties of the pesticide (*i.e.*, the degree to which the pesticide is transported in the plant, the persistence of the pesticide residues, and the levels at which lethal and non-lethal effects occur). As discussed previously, to address these concerns, EPA will continue to require a suite of effects and residue studies, conduct comprehensive chemical-specific risk evaluations according to the Guidance for Assessing Pesticide Risks to Bees[57], and take appropriate action to further mitigate identified risks through the registration and registration review programs based on the available science.

6.4 Indeterminate Bloom

EPA understands that there are some flowering crops and ornamentals that have an indeterminate period of bloom, *i.e*., these crops flower, set fruit and continue to flower throughout the year, and that for these crops bees are present under contract for pollination services for extended periods of time. Examples of indeterminate blooming crops which involve commercial pollination services include: cucurbits, strawberries, *etc*. EPA recognizes that the proposed prohibition on application of acutely toxic pesticides during the time when bees are present under contract may cause significant issues for

[54] DeGrandi-Hoffmann, G., Y. Chen and R. Simonds. 2013. The Effects of Pesticides on Queen Rearing and Virus Titers in Honey Bees (Apis mellifera L.). Insects 4(1): 71 – 89 doi 10.3390/insects4010071

[55] Johnson, R. M. and E. Percel. 2012. Pristine Effects on Queen Rearing Process. Final report to Project Apis m.

[56] Johnson, R.M., E.G. Purcell. 2013. "Effect of 'Bee-Safe' Insecticides and Fungicides on Honey Bee Queen Development and Survival." Poster presented at 2nd International Conference on Pollinator Biology, Health and Policy, Aug. 14–17, 2013, Pennsylvania State University.

[57] *Ibid* USEPA 2014

the growers of these crops. Therefore, EPA requests input during the comment period on alternative mitigation approaches for these pollinator-attractive crops with indeterminate periods of bloom.

6.5 Microbial Pesticides

EPA recognizes that microbial pesticide toxicity values are not typically expressed in terms of micrograms per bee or determined from contact exposure which is typically seen with conventional pesticides. However, the mitigation measures/approach described in this proposal may be appropriate for microbial products that are acutely toxic or pathogenic to bees. Before determining whether mitigation would be appropriate for any microbial pesticide, EPA would need to evaluate whether the honeybee toxicity/pathogenicity studies it receives for microbial pesticides can yield some equivalent information about acute toxicity that is presented by the contact toxicity tests done for conventional chemicals. If not, EPA would need to determine whether additional data are needed to more fully evaluate microbial pesticides' risks to bees, and what regulatory triggers are appropriate for determining the need for this proposed mitigation. These data and resulting triggers might vary based on factors such as the type of microbial pesticide (e.g., insect pathogens, live microbes, killed microbes) and expected routes of exposure.

7 Implementation

Proposed label language that reflect the prohibition of foliar application of acutely toxic products during bloom for sites with bees on-site under contract is provided in Appendix B. Instructions to registrants are to be developed that will describe the specific changes that are to be made to product labels that are consistent with these changes, including the select neonicotinoid products labels that were previously modified to reduce risks to bees.

8 Summary

As discussed in this paper and consistent with previous actions by the EPA and the Strategy, EPA is proposing additional restrictions for pesticide applications to blooming crops where managed bees are present under a contract, for pesticides that are acutely toxic to bees (*i.e.*, those chemicals with an acute contact LD_{50}<11 µg/bee). For applications of acutely toxic pesticides at bloom where bees may be present other than from contracted pollination, EPA is expecting the development of state and tribal managed MP^3s contoured to reflect local needs and conditions to address exposure of managed bees in non-contracted scenarios. EPA will be evaluating on an ongoing basis the effectiveness of these plans at reducing exposure of bees to pesticides. After state or tribal MP^3s have been in place for several years, EPA will then determine whether additional label revisions are appropriate. These actions are intended to reduce the likelihood of acute exposure of honey bees following application of acutely toxic pesticides. In being protective for managed honey bees, these actions are believed to be protective for other solitary and social bees and other pollinators that may be at or near the application site at bloom.

The Agency has relied on multiple lines of evidence (*e.g.*, acute toxicity studies as well as bee kill incident data when available) to support its understanding of the acute exposure to and toxicity of the pesticides in question. The proposed mandatory language in the Directions for Use is based on the available science and the expectation that larger numbers of bees will be present in or near application sites under contracted pollination services. The proposed mitigation is intended to enhance pollinator protection for particular application scenarios and is not intended to supersede more restrictive

product-specific use prohibitions. Through both the registration and registration review programs, EPA will continue to conduct chemical-specific risk assessment for bees that will address other potential routes of exposure (*e.g.*, ingestion of pesticide residues in pollen and nectar) and other potential effects (*e.g.*, chronic effects) and will consider additional, appropriate product-specific mitigation as needed.

Appendix A – List of registered active ingredients that meet the acute toxicity criteria

Abamectin
Acephate
Acetamiprid
Aldicarb
Alpha-cypermethrin
Amitraz
Arsenic acid
Azadirachtin
Bensulide
Beta-cyfluthrin
Bifenazate
Bifenthrin
Carbaryl
Carbofuran
Chlorethoxyfos
Chlorfenapyr
Chlorpyrifos
Chlorpyrifos methyl
Clothianidin
Cyantraniliprole
Cyfluthrin
Cypermethrin
Cyphenothrin
Deltamethrin
Diazinon
Dichlorvos
Dicrotophos
Dimethoate
Dinotefuran
Diuron
D-trans-allethrin
Emamectin benzoate
Endosulfan
Esfenvalerate
Ethoprop
Etofenprox
Fenazaquin
Fenitrothion
Fenpropathrin
Fipronil
Fluvalinate
Fosthiazate
Gamma-cyhalothrin
Imidacloprid
Imiprothrin
Indoxacarb
Lambda-cyhalothrin
Malathion
Metaflumizone
Methiocarb
Methomyl
Momfluorothrin
Naled
Oxamyl
Permethrin
Phenothrin
Phorate
Phosmet
Pirimiphos-methyl
Prallethrin
Profenofos
Propoxur
Pyrethrins
Pyridaben
Resmethrin
Rotenone
Sethoxydim
Spinetoram
Spinosad
Sulfoxaflor
Tefluthrin
Tetrachlorvinphos
Tetramethrin
Thiamethoxam
Tolfenpyrad
Zeta-cypermethrin

Appendix B – Proposed Labeling

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

FOR FOLIAR APPLICATIONS OF THIS PRODUCT TO SITES WITH BEES ON-SITE FOR COMMERICAL POLLINATION SERVICES: Foliar application of this product is prohibited from onset of flowering until flowering is complete when bees are on-site under contract, unless the application is made in association with a government-declared public health response. If site-specific pollinator protection/pre-bloom restrictions exist, then those restrictions must also be followed.