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

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

PC Code: 122804
DP Barcode: D262129

SUBJECT: Review of Proposed amendment to Abamectin label to add uses on plums/prunes, leafy vegetables, and fruiting vegetables

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THRU: Jean Holmes, Acting Branch Chief Jean Holmes 6/15/00
Environmental Risk Branch II / EFED (7507C)

I. Summary

The registrant of abamectin (Novartis Crop Protection, Inc.) is requesting the addition of plums/prunes, leafy vegetables, and fruiting vegetables to the label for Agri-mek 0.15 EC Miticide Insecticide® (EPA Reg. No. 100-898 [the end-use product] and Reg.No.100-895 [technical]).

Please note: Abamectin has extremely high toxicity to aquatic and terrestrial invertebrates. For many years, EFED has only approved of registrations of abamectin that permitted ground application only or aerial application of granular bait. Aerial spray application is strongly discouraged because drift to aquatic habitats or nontarget terrestrial areas would result in a likelihood of acute and chronic risk. Therefore, EFED does not concur with the proposed label that includes aerial spray application, or in general, to any use of abamectin involving aerial spray application.

The proposed uses of abamectin pose potential acute and chronic risks to freshwater and marine/estuarine invertebrates, as well as potential risk to endangered freshwater fish and amphibians (See Tables 6 and 7). Currently, EFED does not assess risk to nontarget insects; however, the results of the honey bee acute toxicity test indicate that abamectin is very highly toxic to bees and suggest that the proposed new uses may pose a risk to endangered insect species. All of these risks could be greatly reduced by prohibiting aerial application. The proposed uses of abamectin are not expected to pose a risk to birds and mammals. why does it say this?

Because of the risk posed to endangered species, the registrant, Novartis, should work towards protecting endangered species through participation in the Endangered Species Task Force. In addition, EFED recommends the following statement for the abamectin labels:

> Use of this product may pose a risk to threatened and endangered species of fish, amphibians, crustaceans (including freshwater shrimp), and insects. All use of this product in the state of California should comply with the recommendations of the California Endangered Species Project. Before using this product in California, consult with your county agricultural commissioner to determine use limitations that apply to your area.

Furthermore, EFED recommends that the label statements on buffer zones/filter strips be changed for this new use, as well as for other registered uses of abamectin. For ground applications, EFED has previously recommended requirement of a 25-ft **vegetative filter strip** between application areas and aquatic habitats to prevent residues of abamectin from moving in runoff to surface water. The current label for grapes and peppers requires only a 25-ft uncultivated buffer zone, which is not the same a vegetative filter strip. A true vegetative filter strip is planted and maintained with specific types of grasses to create a barrier to surface water movement. An uncultivated strip of weeds may be totally inadequate for this function. The proposed label for leafy and fruiting vegetables and plums further weakens this already inadequate level of protection by reducing the width of the uncultivated area from 25 ft to only 10 ft. EFED recommends that the labels be changed to require a 25-ft vegetative filter strip that conforms to the conservation practices standards established by the Natural Resources Conservation Service, USDA. Otherwise, a wider buffer zone would be required to provide adequate protection.

Based upon both the laboratory and field data, ground water effects are expected to be minimal; estimated modeled concentrations in ground water are not expected to exceed 0.0015 μg/L. Please note that these EECs are well below the Limit of Quantitation for the analytical method (LOQ in water = 0. 1µg/L = 100 ng/L).

Surface water contamination could occur from spray drift or runoff events that occur soon after application. Estimates of exposure to aquatic organisms from surface water are based on a Tier I screening model (GENEEC). For the purposes of acute risk calculations for aquatic organisms, the maximum estimated concentrations (EECs) for ground applications to vegetables and plums were 0.4 μg/L and 0.3 μg/L, respectively, and for aerial application to vegetables was 0.5 μg/L.

(Aerial application is not permitted for plums.) EECs used in chronic risk calculations for ground applications were 0.2 μg/L for invertebrates and 0.1 μg/L for fish; for aerial applications, the respective EECs were 0.3 μg/L and 0.2 μg/L.
Estimates of exposure from drinking water derived from surface water were based on the highest potential exposure PRZM-EXAMS scenario (strawberries grown on black plastic) incorporating the Index Reservoir and Percent Cropped Area factor and were provided in a memo dated 4/20/2000 (DP Barcode 265145); estimated drinking water concentrations to be used for exposure to abamectin in drinking water were 1.47 μg/L for the acute toxicity endpoint and 0.71 μg/L for the chronic non-cancer and cancer endpoints.

II. Risk Characterization

Abamectin is extremely toxic to freshwater and estuarine invertebrates. Movement of very small amounts into an aquatic ecosystem would be harmful because it would kill the zooplankton and other small aquatic invertebrates, such as waterfleas, amphipods, and aquatic insects. Furthermore, populations of these aquatic invertebrates may not be able to recover after an acute exposure because their reproduction may be inhibited by remaining trace residues of abamectin. Life-cycle testing with the mysid, a estuarine crustacean, showed that reproduction is significantly impaired at extremely low concentrations, as low as 35 ng/L. Extended reduction in these invertebrate populations would also adversely impact fish and other higher organisms which are dependent on the food source that these populations provide. The result would be degradation of the entire ecosystem. Therefore, it is very important to protect water bodies from exposure to abamectin from both runoff and spray drift. Fortunately, abamectin is not very mobile in soil. Vegetative filter strips should be effective at protecting water bodies by trapping soluble residues and residues attached to suspended particles.

The current label for grapes and peppers requires only a 25-ft uncultivated buffer zone, which is not the same a vegetative filter strip. A true vegetative filter strip is planted with specific types of grasses, as well as possibly other types of perennial vegetation, and must be maintained to serve as a barrier to surface water movement. An uncultivated strip of weeds may be totally inadequate for this function. Standard practices for installing and maintaining vegetative filter strips are available from the Natural Resources Conservation Service of USDA and various university extension services. If it is not practical to require vegetative filter strips that comply to these standard practices, then a wider buffer zone would be required to provide a comparable level of protection to aquatic habitats.

Much larger buffer zones would be required to protect aquatic ecosystems from spray drift. Spray drift precautions were included on the proposed label for cucurbits, fruiting and leafy vegetables, and potatoes as a group; the specified buffer zone for adjacent water bodies was 150 feet for aerial application, and the label also includes standard drift minimization language. However, even with the generic spray drift language and the 150-foot buffer zone, movement of abamectin by spray drift resulting from aerial applications could be devastating to aquatic ecosystems. Spray drift data reported in Bird et al. (Figure 9; 1996) would indicate that at a

distance of 50 meters (approximately 150 feet), deposition of medium to fine sprays ranged from 2 to 8 % of the application. This amount of loading is predicted to be enough to kill aquatic invertebrates, even in a relatively deep (2 m) water body. Therefore, EFED recommends prohibiting aerial spraying of abamectin.

- Another reason for prohibiting aerial applications would be to protect nontarget terrestrial insects, which are also very susceptible to abamectin. Spray drift into adjacent habitat containing flowering plants could pose a risk to beneficial pollinators like bees, butterflies, and moths. Spray drift could also pose a risk to several endangered butterfly species, such as the Karner blue butterfly. Since the larvae of these species would not be expected to occur within agricultural fields, they should not be harmed by ground spraying, but could be harmed by aerial spraying because spray drift could contaminate adjacent habitat where the larvae may feed.

  The 1992 Census of Agriculture does not include information on all the crops mentioned on the label, so the impact on endangered species from use on these crops is uncertain. Use areas are likely small for each smaller use crop, so the increase in the number of crops on which abamectin would be used may not have a large national impact. However, use of the chemical could have significant impact on local freshwater and estuarine ecosystems.

- There are uncertainties associated with the estimated concentrations of abamectin in surface water. The model used to estimate concentrations of abamectin reaching surface water from runoff is designed to be used with field soils; however, many of the vegetable crops are grown on black plastic which covers a large portion of the field. Abamectin is photolabile on soil and adsorbs to soil particles; however, the effect of black plastic on the persistence and subsequent runoff of abamectin is not known. The registrant will be providing more information on the effect of black plastic on the behavior of abamectin in the near future.

  GENEEC was used to estimate exposure of aquatic organisms to the proposed uses of abamectin on leafy and fruiting vegetables and plums. This Tier I screening model may potentially result in slightly higher EECs than if the PRZM-EXAMS model had been used to estimate EECs; however, since many of these crops are also grown on black plastic as noted above, the Tier I screening estimate may or may not be an overestimate.

III. Background

The registrant is requesting the addition of three new use sites for the use of abamectin (PC # 122804); these are leafy vegetables, fruiting vegetables, and plums/prunes. The new use sites apply to the use of the end-use product Agri-mek 0.15 EC Miticide Insecticide® (Reg. No. 100-898), containing 1.9% Abamectin to control: *Liriomyza* leafminers, two-spotted spider mite, and carmine spider mite on leafy vegetables; *Liriomyza* leafminers, spider mites, russet mites, broad mites, *Thrips palmi*, Colorado potato beetle, and tomato pinworm on fruiting vegetables; and two-spotted spider mite, Pacific spider mite, and European redmite on plums and prunes. This

action also applies to the abamectin technical (Reg. No. 100-895), which is for manufacturing use only. Please note that abamectin is already labeled for a number of the vegetable crops individually; the proposed label changes consolidate these crops into the broader categories of "leafy" and "fruiting" vegetables, which also allows for an increase in the numbers of crops in each category on which abamectin would be used.

The crops included in the leafy vegetables are:

celery, lettuce [head and leaf], amaranth, arugala, cardoon, Chinese celery, celtuce, chervil, chrysanthemum [edible-leaved and garland], corn salad, cress [garden and upland], dandelion, dock, endive, fennel, orach, parsley, purslane [garden and winter], radicchio, rhubarb, spinach (leaf, New Zealand, and Vine], and Swiss chard.

The crops included in the fruiting vegetables are:

tomato, eggplant, peppers [bell, chili, cooking, sweet, and pimento],groundcherry, pepino, and tomatillo.

Application Rate on vegetables : 0.009 - 0.019 lb ai/A
No. of Applications: 3
Application Method: Ground and aerial **(Please note that aerial application is <u>proposed</u>. As previously noted, EFED does not concur with the addition of aerial application to the label.)**

Maximum total application per growing season: 0.05625 lb ai/A

Application Rate on plums/prunes : 0.012-0.0234 lbs. ai/A
No. of Applications: 2
Application Method: Ground only
Maximum total application per growing season: 0.046875 lb ai/A

For general use, the maximum seasonal application rate for abamectin on any crop is 0.075 lb ai/A for strawberries.

Previous Buffer Zone Requirements

The size of required buffer zones to protect aquatic habitats has varied considerably in past registration actions for abamectin. For crops where no air application is permitted, the size of the buffer zone varies. For almonds, walnuts, plums, and prunes, the label requires the use of "conventional sprayers"and a buffer zone of 25 yards. For apples, citrus, and pears, the label requires a buffer zone of "110 feet upwind"; it also includes instructions on how to minimize drift. For hops, the label requires "ground equipment" and a buffer zone of 25 feet. For grapes, the label requires conventional sprayers" but no buffer zone is specified. For strawberries, the label does not specify either the type of sprayer to be used or the size of the buffer zone. A recent EFED review for grapes and chili peppers [D244257] recommended a 25-foot vegetated buffer strip to trap runoff and sediment. This apparently led to the following statement that appears on

page 4 of the label:

> Do not cultivate within 25 ft. of the aquatic area so as to allow growth of a vegetative filter strip.

The proposed label for plums, leafy, and fruiting vegetables has a similar statement, but the uncultivated zone was reduced to only 10 ft. **Neither of these label statements is adequate. One cannot create an effective vegetative filter strip by simply not cultivating and allowing weeds to grow. There are standard methods for installing vegetative filter strips that must be followed to ensure that they are effective.**

This is the first time in recent years that EFED has reviewed and commented on a registration of abamectin for a use that includes aerial spray application. All new uses that EFED has reviewed in recent years have been for ground applications or aerial application of a granular bait for fire ant control. Therefore, this review is the first time that EFED has had the opportunity to comment on the newly revised label which allows aerial spray application for certain uses. In 1990, the Ecological Exposure Branch (EEB) in EFED recommended a 100-yard (300-ft) buffer zone for mist-blower application on pears (D258239). Shortly after, EEB recommended that a 100-yard buffer zone be required for all Section 18 registrations, regardless of the application method (D264470). The proposed label requires a buffer zone of 150 ft for aerial applications to protect aquatic habitats, which is only half the 100-yard width recommended by EFED. EFED is recommending removal of all aerial spray applications of abamectin.

IV. Environmental Fate Summary

The environmental fate database for abamectin is incomplete. However, based on the acceptable and supplemental data, the active ingredient Abamectin, which itself is a mixture of avermectins containing ≥80% avermectin B_{1a} (5-0-demethyl avermectin A_{1a}) and ≤20% avermectin B_{1b} (5-0-demethyl-25-de(1-methylpropyl)-25-(1-methylethyl) avermectin A_{1a}), is not expected to persist in the environment under the experimental conditions of submitted studies.

EFED is requesting additional information on aerobic soil metabolism, aerobic aquatic metabolism, and terrestrial field dissipation in order to better assess the behavior of abamectin in the environment.

Results of reviewed studies indicate that abamectin should undergo rapid photodegradation (half-lives of less than one day) in the top 1-2 cm of soil and in clear, shallow surface water. However, in most surface waters, suspended sediments and lack of mixing would decrease the rate of photodegradation significantly. In natural waters, abamectin residues would be expected to be associated with the sediment, reducing aqueous concentrations. Abamectin is also slowly biodegraded in soil (90% upper confidence bound of mean half-life = 115 days). Abamectin is stable to hydrolytic degradation. Based on the low reported vapor pressure (1.5×10^{-9} Torr), volatilization is not likely to be a significant transport process.

Abamectin is nearly insoluble (7.8 μg/L at pH 9) and somewhat mobile (K_{ads} = 9.7 to 160 mg kg^{-1}) in the laboratory; adsorption was correlated with soil organic matter content. However, there are no acceptable field dissipation studies available to determine if the behavior of abamectin in the laboratory is demonstrated in the field.

Based upon the laboratory data, ground water effects are expected to be minimal. Surface water contamination could occur from spray drift or runoff events that occur soon after application.

V. Water Resources Summary

A. Surface Water (Modeling and Monitoring)

1) Aquatic Ecosystems

The Tier I Screening model GENEEC was used to determine estimated concentrations for abamectin in surface water for the uses on leafy and fruiting vegetables and plums (Table 1). EECs were not calculated for degradates of abamectin.

Table 1. Tier I upper tenth percentile EEC's for Abamectin (µg/L)

Crop	Application Rate	Application interval	Application method	Peak	4-Day	21-Day	56-day
Leafy and fruiting vegetables	3 app. @ 0.0188 lb ai/A	7 days	Ground	0.36*	0.34	0.23	0.14
			Aerial	0.46	0.43	0.30	0.18
Plums	2 app. @ 0.0234 lb ai/A	21 days	Ground	0.29	0.27	0.19	0.11

*EECs rounded to 2 significant figures.

Input values used in the surface water model are given in Table 2.

Table 2. Surface Water Exposure Inputs for GENEEC for Parent Abamectin

MODEL INPUT VARIABLE	INPUT VALUE	COMMENTS
Application Rate (lbs ai/A)	0.0188 (Leafy and fruiting vegetables) 0.0234 (Plums)	Current label (EPA Reg.No. 100-898)
Maximum No. of Applications	3 (Leafy and fruiting vegetables) 2 (Plums)	Current label
Application Interval (days)	7 (Leafy and fruiting vegetables) 21 (Plums)	Current Label

K_{oc}	2,531	Lowest non-sand K_{oc} of 2,531 in Three Bridges silt loam (1.22 % OC). MRID 40856301
Aerobic Soil Metabolic Half-life (days)	115	90% upper-bound confidence limit of mean half-life
Is the pesticide wetted-in?	No	Current label
Depth of Incorporation (in.)	0	Current label
Spray Drift	5 (leafy and fruiting vegetables) 1 (leafy and fruiting vegetables, plums)	Aerial = 5%; Ground = 1%
Solubility (µg/L)	7.8	At pH 9; EFGWI3 One-Liner Database
Aerobic Aquatic Metabolic Half-life (days)	230	No acceptable aerobic aquatic metabolism data were available. Per current EFED guidance, use 2x aerobic soil metabolism half-life.
Hydrolysis (pH 7) half-life (days)	0	Stable. Maynard and Ku, 1982. Acc. # 249152. Review dated 4/18/83.
Photolysis Half-life (days)	0.5	Dark-control adjusted half-life. Ku and Jacob, 1983, Acc. # 252115, Review dated 3/28/84.

2) Drinking Water

As previously stated, a Tier II screening assessment of estimated environmental concentrations (EECs) for abamectin in drinking water resulting from the uses on strawberries was performed. EFED did not perform a Tier II surface water drinking water assessment for the vegetable or plum scenarios because strawberries were considered a higher exposure scenario (4 applications per season @ 0.01875 lb ai/A [the highest national use rate for abamectin] vs. 3 applications for vegetables @ 0.01875 lb ai/A, and 2 applications for plums @ 0.0234 lb ai/A). Please refer to the review dated 4/20/2000 (D265145) for further details.

3) Monitoring

Surface water monitoring data was not available to the Environmental Fate and Effects Division (EFED) for abamectin at this time.

B. Ground Water (Modeling and Monitoring)

Ground water monitoring data for abamectin were not available to EFED at this time.
Results from the SCI-GROW screening model predict that the maximum chronic concentration of parent abamectin in shallow ground water is not expected to exceed 2.0 ng/L for the current maximum use rate on strawberries, 1.5 ng/L for the proposed use on leafy and fruiting vegetables,

and 1.2 ng/L for the proposed use on plums. Please note that these EECs are well below the Limit of Quantitation for the analytical method (LOQ in water = 0. 1µg/L = 100 ng/L).

The SCI-GROW model (Version 1.2; executable file dated 11/12/97) was used to estimate concentrations of abamectin that could be found in drinking water derived from ground water, using the input values listed in Table 3. EECs were not calculated for degradates of abamectin.

Table 3. Ground Water Exposure Inputs for SCI-GROW for Parent Abamectin

MODEL INPUT VARIABLE	INPUT VALUE	COMMENTS
Application Rate (lbs. ai/A)	0.0234 (Plums) 0. 0188 (Leafy and fruiting vegetables; strawberries)	Current label ((EPA Reg.No. 100-898)
Maximum No. of Applications	2 (Plums) 3 (Leafy and fruiting vegetables) 4 (Strawberries)	Current label.
K_{oc}	2,531	Lowest non-sand K., of 2,531 in Three Bridges silt loam (1.22 % OC). Lowest K_{oc} was used since the K_{oc}'s differed by more than a factor of 3. MRID 40856301
Aerobic Soil Metabolic Half-life (days)	70	Mean of 70 days from individual half-lives of 34, 41, 72, and 131 days. Ku and Jacob, 1983, No MRID available, Review dated 3/28/84.

C. Recommendations for Drinking Water Concentrations

The EFED recommended drinking water concentrations were previously calculated, incorporating the Index Reservoir and Percent Cropped Area policy in place in EFED (memo dated 4/20/2000; D265145). The use site modeled was strawberries grown on black plastic mulch in Florida. Please note that the certainty of the concentrations estimated for strawberries is low, due to uncertainty on the amount of runoff from plant beds covered in plastic mulch and uncertainty on the amount of degradation of abamectin on black plastic compared to soil. EFED did not model the vegetable or plum scenarios because strawberries were considered a higher exposure scenario (4 applications per season allowed for strawberries vs. 3 applications for vegetables).

Crop specific consecutive PRZM-EXAM simulations were conducted to evaluate the cumulative probability distribution for peak and annual mean EECs, which are presented in Table 4.

Table 4. Estimated drinking water concentrations to be used for exposure to Abamectin in drinking water derived from Surface Water			
Toxicity Endpoint	Model EEC Value (µg/L)	Use Modeled	PCA Modeled
Acute	1.47*	Strawberries in Florida; 4 ground applications @ 0.01875 lb ai/A; application intervals of 7 days, 21 days, 7 days (per label instructions for strawberries)	The default PCA factor of 0.87 was used because at this time no PCA specific for strawberries has been developed
Chronic non-cancer	0.71		
Cancer	0.71		

*One-in-ten-year value reported.

VI. Ecological Risk Assessment

1. Ecological Toxicity Data

Acc. 246358 (supplemental)

Terrestrial Animals: On an acute oral basis abamectin is moderately toxic to waterfowl (mallard LD_{50} = 85 mg ai/kg), but is practically nontoxic to upland game birds (bobwhite LD_{50} > 2000 mg ai/kg). On a subacute dietary basis, abamectin is highly toxic to waterfowl (mallard LC_{50} = 383 ppm ai), but only slightly toxic to upland game birds (bobwhite LC_{50} = 3,100 ppm ai). The NOAEL for avian reproduction effects is 12 ppm ai based on results for the mallard. Abamectin is highly toxic to mammals on an acute oral basis (mice LD_{50}'s: 11.4 - 41.3 mg ai/kg). It is also highly toxic to the honeybee (LD_{50} = 0.41 µg/bee).

Aquatic Animals: Abamectin is extremely toxic to aquatic organisms. The lowest LC_{50} for a freshwater fish is 3.2 µg ai/L for the rainbow trout, classifying abamectin as very highly toxic to freshwater fish. The NOAEL and LOAEL obtained in a trout early life-stage study are 0.52 µg ai/L and 0.96 µg ai/L, respectively. Abamectin is very highly toxic to freshwater invertebrates (*Daphnia magna* LC_{50}'s: 0.22 - 0.34 µg ai/L). Chronic effects to aquatic invertebrates occur at extremely low levels (*Daphnia magna* NOAEL = 0.03 µg ai/L, LOAEL = 0.09 µg ai/L). Toxicity is even greater to estuarine crustaceans (mysid LC_{50} = 0.022 µg ai/L, NOAEL = 0.0035 µg ai/L, LOAEL = 0.0093 µg ai/L). Abamectin is very highly toxic to estuarine/marine fish (sheepshead minnow LC_{50} = 15 µg ai/L).

Terrestrial and Aquatic Plants: Abamectin is not very toxic to aquatic plants. The EC_{50}'s for duckweed (*Lemna gibba*) and green algae (*Kirchneria subcapitata*) are 3.9 and >100 mg a.i./L, respectively. Data are not available for toxicity to terrestrial plants.

2. Risk Quotients

Use of abamectin on fruiting vegetables, leafy vegetables, and plums/prunes poses similar risks as other registered uses. Previous EFED reviews (e.g. D214852 [dated 5/16/96] and D217627 [dated 3/4/96]) provide risk quotients for birds and mammals that are applicable for fruiting

Mysid shrimp
Acc No. 40856304 LC_{50} = 22 ng/L = 0.022ppb

vegetables, leafy vegetables, and plums/prunes. These previous reviews found that abamectin is predicted to pose minimal risk to birds and mammals. However, bees and other nontarget insects exposed to abamectin can be adversely impacted.

We have revised the risk quotients for fish and aquatic invertebrates based on the new aquatic estimated environmental concentrations (EEC's). The maximum single use rate is 0.019 lb ai/A applied three times by air or ground application for both fruiting vegetables and leafy vegetables. The maximum single use rate for plums/prunes is 0.024 lbs ai/A applied two times by ground. Aquatic risk quotients for the maximum use rate are provided in Tables 5 & 6. Acute risk quotients are based on the peak estimated environmental concentration (EEC). Chronic risk quotients are based on the 56-day average EEC for fish and the 21-day average EEC for freshwater invertebrates.

The following table lists the acute and chronic risk quotients (RQs) and estimated environmental concentrations (EEC) for abamectin's use on **leafy vegetables and fruiting vegetables**. The EEC's were based on an application rate 0.019 lbs ai/A applied three times by both ground and aerial application.

not sure where 3.2 came from.

Table 5. Leafy and Fruiting Vegetables - Three applications of Abamectin at 0.019 lbs ai/A

Organism	LC50	NOAEL	Ground Application			Aerial Application		
			EEC[1]	Acute RQ[2]	Chronic RQ[2]	EEC[1]	Acute RQ[2]	Chronic RQ[2]
Freshwater Fish- Rainbow Trout	3.2 ppb (246358)	0.52 ppb	Peak = 0.4ppb 56day = 0.1ppb	0.13	0.19	Peak = 0.5ppb 56day = 0.2ppb	0.16	0.38
Freshwater Invertebrate - *Daphnia magna*	0.22 ppb	0.03 ppb	Peak = 0.4ppb 21day = 0.2ppb	1.8	6.6	Peak = 0.5ppb 21day = 0.3ppb	2.27	10
Estuarine/ Marine Fish - Sheepshead minnow	15 ppb	--[3]	Peak = 0.4ppb	0.03	--[3]	Peak = 0.5ppb	0.03	--[3]
Estuarine/ Marine Invertebrate- Mysid shrimp	0.022 ppb ✓	0.0035 ppb	Peak = 0.4ppb 21day = 0.2ppb	18.2	57.1	Peak = 0.5ppb 21day = 0.3ppb	22.7	85.7

1) EECs rounded to 1 significant figure; based on three applications at 0.019 lbs ai/A
2) RQ = EEC/Toxicity Endpoint
3) -- = No data available

Acc No. 40856306

For both ground and aerial applications, RQs for estuarine/marine and freshwater invertebrates exceeds the LOCs for high acute (0.5) and chronic risk (1.0). Furthermore, the RQs for both ground and aerial application exceed the restricted use (0.1) and the endangered species (0.05) acute risk LOCs for freshwater fish. The ground and aerial application RQs do not exceed the aquatic LOCs for for acute risk to estuarine/marine fish. Although no chronic effects data are available, it is not expected that these proposed uses of abamectin will pose a chronic risk to estuarine/marine fish, based on the absence of a chronic risk to the freshwater fish species tested, which shows a somewhat higher acute sensitivity (lower LC_{50}) to abamectin.

Acc No. 246358 Acute tox to Daphnia LC_{50} = 0.34 ppb NOAEC < 0.31 ug/L

259364 Chronic " " NOAEC 0.03 ppb

The following table lists the acute and chronic risk quotients (RQs) and estimated environmental concentrations (EECs) for abamectin's use on **plums/prunes.** The EEC's were based on an application rate of 0.023 lbs ai/A applied two times by ground application.

Table 6. Plums/Prunes -Two applications of Abamectin at 0.023 lbs ai/A-Ground Application only

Organism	LC50	NOAEL	EEC[1]	Acute RQ[2]	Chronic RQ[2]
Freshwater Fish- Rainbow Trout	3.2 ppb	0.52 ppb	Peak = 0.3ppb 56day = 0.1ppb	0.09	0.19
Freshwater Invertebrate - *Daphnia magna*	0.22 ppb	0.03 ppb	Peak = 0.3ppb 21day = 0.2ppb	1.36	6.67
Estuarine/Marine Fish - Sheepshead minnow	15 ppb	--[3]	Peak = 0.3ppb	0.02	--[3]
Estuarine/Marine Invertebrate - Mysid shrimp	0.022 ppb	0.0035 ppb	Peak = 0.3ppb 21day = 0.2ppb	13.6	57

1) EECs rounded to 1 significant figure; based on two applications at 0.023 lbs ai/A by ground.
2) RQ = EEC/Toxicity Endpoint
3) -- = No data available

For both ground and aerial applications, RQs for estuarine/marine and freshwater invertebrates exceed the LOCs for high acute (0.5) and chronic risk (1.0). Furthermore, the RQs for ground application of abamectin on plums/prunes exceed the restricted use (0.1) and the endangered species (0.05) LOCs for freshwater fish. The RQs do not exceed any of the aquatic LOCs for estuarine/marine fish. Although no chronic effects data are available, it is not expected that this proposed use of abamectin will pose a chronic risk to estuarine/marine fish, based on the absence of a chronic risk to the freshwater fish species tested, which shows a somewhat higher acute sensitivity (lower LC_{50}) to abamectin.

3. Endangered Species

Use of abamectin on leafy vegetables, fruiting vegetables, and plums/prunes poses a risk to many threatened and endangered species of fish, amphibians, crustaceans, and insects (Appendix A). Risk is greatest to nontarget insects, including several species of moths and butterflies, and to aquatic crustaceans, including several species of fairy shrimp occurring in California. California has an effective endangered species program in place that should provide adequate protection of species in that state. Outside of California, special care should be taken to protect the Nashville crayfish and the Karne Blue butterfly. Abamectin is less toxic to fish and poses only a minor risk from direct toxic effects, but is likely to cause indirect effects through reducing the aquatic invertebrate populations on which they feed. Abamectin has been found to have relatively low toxicity to mollusks (oyster larvae LC_{50} = 430 ppb) and is therefore not expected to pose a risk to threatened or endangered species of freshwater mussels.

The registrant, Novartis, should work towards protecting these species through participation in the Endangered Species Task Force. The Endangered Species Protection Program is expected to become final in the future. This program may require modification in the use of abamectin to protect threatened and endangered species. Such modifications would most likely consist of generic label statements referring pesticide users to use limitations defined by County Bulletins. In the meantime, the risk mitigation measures discussed in the risk characterization section (prohibiting aerial application and requiring a buffer zone) will help to mitigate risk to threatened and endangered species. In addition, EFED recommends the following statement for the abamectin label:

> Use of this product may pose a risk to threatened and endangered species of fish, amphibians, crustaceans (including freshwater shrimp), and insects. All use of this product in the state of California should comply with the recommendations of the California Endangered Species Project. Before using this product in California, consult with your county agricultural commissioner to determine use limitations that apply to your area. Use of abamectin on leafy vegetables, fruiting vegetables, and plums/prunes pose a risk to threatened and endangered species of fish, amphibians, crustaceans, and insects (see Appendix I). According to EFED's risk criteria, no endangered birds or mammals should be impacted from the use of abamectin.

References:

Bird, S.L., D.M. Esterly, and S.G. Perry. 1996. Off-target deposition of pesticides from agricultural aerial spray applications. J. Environ. Qual. 25:1095-1104.

Tier I GENEEC Values for Abamectin in Surface Water

Vegetables - Ground application

Abamectin INPUT VALUES

RATE (#/AC) ONE(MULT)	APPLICATIONS NO.-INTERVAL	SOIL KOC	SOLUBILITY (PPB)	% SPRAY DRIFT	INCORP DEPTH(IN)
.019(.054)	3 7	2531.0	7.8	1.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
115.00	0	N/A	.50- 61.35	*****	48.43

GENERIC EECs (IN PPT)

PEAK GEEC	AVERAGE 4 DAY GEEC	AVERAGE 21 DAY GEEC	AVERAGE 56 DAY GEEC
362.48	335.29	229.08	139.22

Vegetables - Aerial application

Abamectin INPUT VALUES

RATE (#/AC) ONE(MULT)	APPLICATIONS NO.-INTERVAL	SOIL KOC	SOLUBILITY (PPB)	% SPRAY DRIFT	INCORP DEPTH(IN)
.019(.054)	3 7	2531.0	7.8	5.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
115.00	0	N/A	.50- 61.35	*****	48.43

GENERIC EECs (IN PPT)

PEAK GEEC	AVERAGE 4 DAY GEEC	AVERAGE 21 DAY GEEC	AVERAGE 56 DAY GEEC
456.66	425.83	288.67	173.11

Plums - Ground application

Abamectin INPUT VALUES

RATE (#/AC) ONE(MULT)	APPLICATIONS NO.-INTERVAL	SOIL KOC	SOLUBILITY (PPB)	% SPRAY DRIFT	INCORP DEPTH(IN)
.023(.044)	2 21	2531.0	7.8	1.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
115.00	0	N/A	.50- 61.35	*****	48.43

GENERIC EECs (IN PPT)

PEAK GEEC	AVERAGE 4 DAY GEEC	AVERAGE 21 DAY GEEC	AVERAGE 56 DAY GEEC
294.43	272.33	186.08	113.09

Tier I SCI-GROW Values for Abamectin in Ground Water

Plums - Ground application

Abamectin INPUT VALUES

APPL (#/AC) RATE	APPL. NO.	URATE (#/AC/YR)	SOIL KOC	SOIL AEROBIC METABOLISM (DAYS)
.023	2	.047	2531.0	70.0

GROUND-WATER SCREENING CONCENTRATIONS IN PPB

.001225

A= 65.000 B= 2536.000 C= 1.813 D= 3.404 RILP= 1.080
F= -1.582 G= .026 URATE= .047 GWSC= .001225

Leafy and fruiting vegetables - Ground and aerial application

Abamectin INPUT VALUES

APPL (#/AC) RATE	APPL. NO.	URATE (#/AC/YR)	SOIL KOC	SOIL AEROBIC METABOLISM (DAYS)
.019	3	.056	2531.0	70.0

GROUND-WATER SCREENING CONCENTRATIONS IN PPB

.001476

A= 65.000 B= 2536.000 C= 1.813 D= 3.404 RILP= 1.080
F= -1.582 G= .026 URATE= .056 GWSC= .001476

Strawberries - Ground application

Abamectin INPUT VALUES

APPL (#/AC) RATE	APPL. NO.	URATE (#/AC/YR)	SOIL KOC	SOIL AEROBIC METABOLISM (DAYS)
.019	4	.075	2531.0	70.0

GROUND-WATER SCREENING CONCENTRATIONS IN PPB

.001969

A= 65.000 B= 2536.000 C= 1.813 D= 3.404 RILP= 1.080
F= -1.582 G= .026 URATE= .075 GWSC= .001969

APPENDIX I
Endangered Species

Plums/Prunes

Ag Census updated through: October 1, 1992
Species database updated through October 1 1992

Wednesday 02/09/00 12:04

Species in counties where **Plums & prunes**(fresh wt) are grown.

SALAMANDER, DESERT SLENDER	AMPHIBIAN	E	KNOWN
SALAMANDER, SANTA CRUZ LONG-TOED	AMPHIBIAN	E	KNOWN
TOAD, ARROYO SOUTHWESTERN	AMPHIBIAN	E	KNOWN
LINDERIELLA, CALIFORNIA	CRUSTACEAN	E	KNOWN
SHRIMP, CALIFORNIA FRESHWATER	CRUSTACEAN	E	KNOWN
SHRIMP, CONSERVANCY FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, LONGHORN FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, RIVERSIDE FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, VERNAL POOL FAIRY	CRUSTACEAN	T	KNOWN
SHRIMP, VERNAL POOL TADPOLE	CRUSTACEAN	E	KNOWN
CATFISH, YAQUI	FISH	T,CH	KNOWN
CHUB, BONYTAIL	FISH	E.CH	POSSIBLE
CHUB, MOHAVE TUI	FISH	E	KNOWN
CHUB, OREGON	FISH	E	KNOWN
CHUB, YAQUI	FISH	E,CH	KNOWN
GOBY, TIDEWATER	FISH	E	POSSIBLE
PUPFISH, DESERT	FISH	E,CH	KNOWN
SALMON, CHINOOK (SACRAMENTO RIVER WINTER RUN)	FISH	E	KNOWN
SALMON, CHINOOK (SNAKE RIVER FALL RUN)	FISH	T	POSSIBLE
SALMON, CHINOOK (SNAKE RIVER SPRING/SUMMER)	FISH	T	POSSIBLE
SALMON, COHO (CENTRAL CALIFORNIA COAST POP)	FISH	E	POSSIBLE
SALMON, COHO (SOUTHERN OR/NORTHERN CA COAST)	FISH	T	POSSIBLE
SHINER, BEAUTIFUL	FISH	T,CH	KNOWN
SHRIMP, SAN DIEGO FAIRY	FISH	E	POSSIBLE
SMELT, DELTA	FISH	T	KNOWN
SQUAWFISH, COLORADO	FISH	CH	POSSIBLE
STEELHEAD, CALIFORNIA CENTRAL VALLEY POP	FISH	E	POSSIBLE
STEELHEAD, CENTRAL CALIFORNIA POPULATION	FISH	T	POSSIBLE
STEELHEAD, KLAMATH MOUNTAINS PROVINCE	FISH	T	KNOWN
STEELHEAD, LOWER COLUMBIA RIVER POPULATION	FISH	T	POSSIBLE
STEELHEAD, NORTHERN CALIFORNIA POPULATION	FISH	T	POSSIBLE
STEELHEAD, OREGON COAST POPULATION	FISH	T	POSSIBLE
STEELHEAD, SNAKE RIVER BASIN POPULATION	FISH	T	POSSIBLE
STEELHEAD, SOUTH-CENTRAL CALIFORNIA POP	FISH	T	POSSIBLE
STEELHEAD, SOUTHERN CALIFORNIA POPULATION	FISH	E	POSSIBLE
STEELHEAD, UPPER COLUMBIA RIVER POPULATION	FISH	E	POSSIBLE
STICKLEBACK, UNARMORED THREESPINE	FISH	E,CH	KNOWN
STURGEON, PALLID	FISH	E	KNOWN
STURGEON, SHORTNOSE	FISH	E	KNOWN
SUCKER, RAZORBACK	FISH	E,CH	KNOWN
TOPMINNOW, GILA (YAQUI)	FISH	E	KNOWN
TROUT, BULL (COLUMBIA RIVER POPULATION)	FISH	T	POSSIBLE
TROUT, CUTTHROAT (UMPQUA RIVER POPULATION)	FISH	E	POSSIBLE
TROUT, LAHONTAN CUTTHROAT	FISH	T	KNOWN
TROUT, LITTLE KERN GOLDEN	FISH	T,CH	POSSIBLE
TROUT, PAIUTE CUTTHROAT	FISH	T	POSSIBLE

Plums/Prunes cont'd.

BEETLE, DELTA GREEN GROUND	INSECT	T,CH	KNOWN
BEETLE, MOUNT HERMON JUNE	INSECT	E	POSSIBLE
BEETLE, VALLEY ELDERBERRY LONGHORN	INSECT	T,CH	KNOWN
BUTTERFLY, BAY CHECKERSPOT	INSECT	T,CH	KNOWN
BUTTERFLY, BEHREN'S SILVERSPOT	INSECT	E	KNOWN
BUTTERFLY, EL SEGUNDO BLUE	INSECT	E	KNOWN
BUTTERFLY, KARNER BLUE	INSECT	E	KNOWN
BUTTERFLY, LANGE'S METALMARK	INSECT	E	KNOWN
BUTTERFLY, LOTIS BLUE	INSECT	E	KNOWN
BUTTERFLY, MITCHELL'S SATYR	INSECT	E	KNOWN
BUTTERFLY, MYRTLE'S SILVERSPOT	INSECT	E	KNOWN
BUTTERFLY, OREGON SILVERSPOT	INSECT	T,CH	KNOWN
BUTTERFLY, PALOS VERDES BLUE	INSECT	E,CH	KNOWN
BUTTERFLY, QUINO CHECKERSPOT	INSECT	E	POSSIBLE
FLY, DELHI SANDS FLOWER-LOVING	INSECT	E	KNOWN
GRASSHOPPER, ZAYANTE BAND-WINGED	INSECT	E	POSSIBLE
MOTH, KERN PRIMROSE SPHINX	INSECT	T	KNOWN
SKIPPER, LAGUNA MOUNTAIN	INSECT	E	POSSIBLE
SNAIL, MORRO SHOULDERBAND	SNAIL	E	KNOWN

Leafy Vegetables
(Lettuce)

Ag Census updated through: October 1, 1992
Species database updated through October 1 1992

Wednesday 02/09/00 11:57

Species in counties where **Lettuce and Romaine,** Harvested are grown.

FROG, CALIFORNIA RED-LEGGED	AMPHIBIAN	T	KNOWN
SALAMANDER, DESERT SLENDER	AMPHIBIAN	E	KNOWN
SALAMANDER, SANTA CRUZ LONG-TOED	AMPHIBIAN	E	KNOWN
TOAD, ARROYO SOUTHWESTERN	AMPHIBIAN	E	KNOWN
LINDERIELLA, CALIFORNIA	CRUSTACEAN	E	KNOWN
SHRIMP, CALIFORNIA FRESHWATER	CRUSTACEAN	E	KNOWN
SHRIMP, CONSERVANCY FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, LONGHORN FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, RIVERSIDE FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, SQUIRREL CHIMNEY CAVE	CRUSTACEAN	T	KNOWN
SHRIMP, VERNAL POOL FAIRY	CRUSTACEAN	T	KNOWN
SHRIMP, VERNAL POOL TADPOLE	CRUSTACEAN	E	KNOWN
CATFISH, YAQUI	FISH	T,CH	KNOWN
CHUB, BONYTAIL	FISH	E,CH	KNOWN
CHUB, MOHAVE TUI	FISH	E	KNOWN
CHUB, OREGON	FISH	E	KNOWN
CHUB, YAQUI	FISH	E,CH	KNOWN
GOBY, TIDEWATER	FISH	E	POSSIBLE
MINNOW, LOACH	FISH	T,CH	KNOWN
PUPFISH, DESERT	FISH	E,CH	KNOWN
SALMON, CHINOOK (SACRAMENTO RIVER WINTER RUN)	FISH	E	POSSIBLE
SALMON, CHINOOK (SNAKE RIVER FALL RUN)	FISH	T	POSSIBLE

Leafy Vegetables
(Lettuce cont'd)

SALMON, CHINOOK (SNAKE RIVER SPRING/SUMMER)	FISH	T	POSSIBLE
SALMON, COHO (CENTRAL CALIFORNIA COAST POP)	FISH	E	POSSIBLE
SALMON, COHO (SOUTHERN OR/NORTHERN CA COAST)	FISH	T	POSSIBLE
SHINER, BEAUTIFUL	FISH	T,CH	KNOWN
SHRIMP, SAN DIEGO FAIRY	FISH	E	POSSIBLE
SMELT, DELTA	FISH	T	KNOWN
SPIKEDACE	FISH	T,CH	KNOWN
SQUAWFISH, COLORADO	FISH	CH	POSSIBLE
STEELHEAD, CALIFORNIA CENTRAL VALLEY POP	FISH	E	POSSIBLE
STEELHEAD, CENTRAL CALIFORNIA POPULATION	FISH	T	POSSIBLE
STEELHEAD, KLAMATH MOUNTAINS PROVINCE	FISH	T	POSSIBLE
STEELHEAD, LOWER COLUMBIA RIVER POPULATION	FISH	T	POSSIBLE
STEELHEAD, NORTHERN CALIFORNIA POPULATION	FISH	T	POSSIBLE
STEELHEAD, OREGON COAST POPULATION	FISH	T	POSSIBLE
STEELHEAD, SNAKE RIVER BASIN POPULATION	FISH	T	POSSIBLE
STEELHEAD, SOUTH-CENTRAL CALIFORNIA POP	FISH	T	POSSIBLE
STEELHEAD, SOUTHERN CALIFORNIA POPULATION	FISH	E	POSSIBLE
STEELHEAD, UPPER COLUMBIA RIVER POPULATION	FISH	E	POSSIBLE
STICKLEBACK, UNARMORED THREESPINE	FISH	E,CH	KNOWN
STURGEON, SHORTNOSE	FISH	E	KNOWN
SUCKER, RAZORBACK	FISH	E,CH	KNOWN
TOPMINNOW, GILA (YAQUI)	FISH	E	KNOWN
TROUT, BULL (COLUMBIA RIVER POPULATION)	FISH	T	POSSIBLE
TROUT, CUTTHROAT (UMPQUA RIVER POPULATION)	FISH	E	POSSIBLE
TROUT, GILA	FISH	E	KNOWN
TROUT, LITTLE KERN GOLDEN	FISH	T,CH	POSSIBLE
TROUT, PAIUTE CUTTHROAT	FISH	T	POSSIBLE
BEETLE, MOUNT HERMON JUNE	INSECT	E	POSSIBLE
BEETLE, VALLEY ELDERBERRY LONGHORN	INSECT	T,CH	KNOWN
BUTTERFLY, BAY CHECKERSPOT	INSECT	T,CH	KNOWN
BUTTERFLY, BEHREN'S SILVERSPOT	INSECT	E	KNOWN
BUTTERFLY, CALLIPPE SILVERSPOT	INSECT	E	KNOWN
BUTTERFLY, EL SEGUNDO BLUE	INSECT	E	KNOWN
BUTTERFLY, KARNER BLUE	INSECT	E	KNOWN
BUTTERFLY, LOTIS BLUE	INSECT	E	KNOWN
BUTTERFLY, MISSION BLUE	INSECT	E	KNOWN
BUTTERFLY, MYRTLE'S SILVERSPOT	INSECT	E	KNOWN
BUTTERFLY, OREGON SILVERSPOT	INSECT	T,CH	KNOWN
BUTTERFLY, PALOS VERDES BLUE	INSECT	E,CH	KNOWN
BUTTERFLY, QUINO CHECKERSPOT	INSECT	E	POSSIBLE
BUTTERFLY, SAN BRUNO ELFIN	INSECT	E	KNOWN
BUTTERFLY, SCHAUS SWALLOWTAIL	INSECT	E	KNOWN
BUTTERFLY, SMITH'S BLUE	INSECT	E	KNOWN
BUTTERFLY, UNCOMPAHGRE FRITILLARY	INSECT	E	KNOWN
FLY, DELHI SANDS FLOWER-LOVING	INSECT	E	KNOWN
GRASSHOPPER, ZAYANTE BAND-WINGED	INSECT	E	POSSIBLE
MOTH, KERN PRIMROSE SPHINX	INSECT	T	KNOWN
SKIPPER, LAGUNA MOUNTAIN	INSECT	E	POSSIBLE
SNAIL, MORRO SHOULDERBAND	SNAIL	E	KNOWN
TALUSSNAIL, SAN XAVIER	SNAIL	E	KNOWN

Leafy Vegetables
(Endive)

Ag Census updated through: October 1, 1992
Species database updated through October 1 1992

Tuesday 05/16/00 14:15

Species in counties where **Endive**, Harvested (acres) are grown.

FROG, CALIFORNIA RED-LEGGED	AMPHIBIAN	T	KNOWN
SALAMANDER, SANTA CRUZ LONG-TOED	AMPHIBIAN	E	KNOWN
LINDERIELLA, CALIFORNIA	CRUSTACEAN	E	KNOWN
SHRIMP, VERNAL POOL FAIRY	CRUSTACEAN	T	KNOWN
GOBY, TIDEWATER	FISH	E	POSSIBLE
STEELHEAD, SOUTH-CENTRAL CALIFORNIA POP	FISH	T	POSSIBLE
STURGEON, SHORTNOSE	FISH	E	KNOWN
BUTTERFLY, SMITH'S BLUE	INSECT	E	KNOWN

Leafy Vegetables
(Celery)

Ag Census updated through: October 1, 1992
Species database updated through October 1 1992

Tuesday 05/16/00 13:56

Species in counties where **Celery**, Harvested (acres) are grown.

FROG, CALIFORNIA RED-LEGGED	AMPHIBIAN	T	KNOWN
SALAMANDER, SANTA CRUZ LONG-TOED	AMPHIBIAN	E	KNOWN
TOAD, ARROYO SOUTHWESTERN	AMPHIBIAN	E	KNOWN
LINDERIELLA, CALIFORNIA	CRUSTACEAN	E	KNOWN
SHRIMP, CONSERVANCY FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, LONGHORN FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, VERNAL POOL FAIRY	CRUSTACEAN	T	KNOWN
CHUB, BONYTAIL	FISH	E,CH	POSSIBLE
GOBY, TIDEWATER	FISH	E	POSSIBLE
PUPFISH, DESERT	FISH	E,CH	KNOWN
SALMON, COHO (CENTRAL CALIFORNIA COAST POP)	FISH	E	POSSIBLE
SQUAWFISH, COLORADO	FISH	CH	POSSIBLE
STEELHEAD, CENTRAL CALIFORNIA POPULATION	FISH	T	POSSIBLE
STEELHEAD, SOUTH-CENTRAL CALIFORNIA POP	FISH	T	POSSIBLE
STEELHEAD, SOUTHERN CALIFORNIA POPULATION	FISH	E	POSSIBLE
STICKLEBACK, UNARMORED THREESPINE	FISH	E,CH	KNOWN
SUCKER, RAZORBACK	FISH	E,CH	KNOWN
BEETLE, MOUNT HERMON JUNE	INSECT	E	POSSIBLE
BUTTERFLY, KARNER BLUE	INSECT	E	KNOWN
BUTTERFLY, MITCHELL'S SATYR	INSECT	E	KNOWN
BUTTERFLY, SMITH'S BLUE	INSECT	E	KNOWN
FLY, DELHI SANDS FLOWER-LOVING	INSECT	E	KNOWN
GRASSHOPPER, ZAYANTE BAND-WINGED	INSECT	E	POSSIBLE
SNAIL, MORRO SHOULDERBAND	SNAIL	E	KNOWN

Leafy Vegetables
(Spinach)

Ag Census updated through: October 1, 1992
Species database updated through October 1 1992

Tuesday 05/16/00 14:20

Species in counties where Spinach, Harvested (acres) are grown.

FROG, CALIFORNIA RED-LEGGED	AMPHIBIAN	T	KNOWN
SALAMANDER, DESERT SLENDER	AMPHIBIAN	E	KNOWN
SALAMANDER, SANTA CRUZ LONG-TOED	AMPHIBIAN	E	KNOWN
TOAD, ARROYO SOUTHWESTERN	AMPHIBIAN	E	KNOWN
LINDERIELLA, CALIFORNIA	CRUSTACEAN	E	KNOWN
SHRIMP, CONSERVANCY FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, LONGHORN FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, RIVERSIDE FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, VERNAL POOL FAIRY	CRUSTACEAN	T	KNOWN
SHRIMP, VERNAL POOL TADPOLE	CRUSTACEAN	E	KNOWN
CHUB, BONYTAIL	FISH	E,CH	POSSIBLE
CHUB, OREGON	FISH	E	KNOWN
DARTER, LEOPARD	FISH	T,CH	KNOWN
GOBY, TIDEWATER	FISH	E	POSSIBLE
PUPFISH, DESERT	FISH	E,CH	KNOWN
SALMON, CHINOOK (SNAKE RIVER FALL RUN)	FISH	T	POSSIBLE
SALMON, CHINOOK (SNAKE RIVER SPRING/SUMMER)	FISH	T	KNOWN
SQUAWFISH, COLORADO	FISH	CH	POSSIBLE
STEELHEAD, CALIFORNIA CENTRAL VALLEY POP	FISH	E	POSSIBLE
STEELHEAD, LOWER COLUMBIA RIVER POPULATION	FISH	T	POSSIBLE
STEELHEAD, SNAKE RIVER BASIN POPULATION	FISH	T	POSSIBLE
STEELHEAD, SOUTH-CENTRAL CALIFORNIA POP	FISH	T	POSSIBLE
STEELHEAD, SOUTHERN CALIFORNIA POPULATION	FISH	E	POSSIBLE
STEELHEAD, UPPER COLUMBIA RIVER POPULATION	FISH	E	POSSIBLE
STICKLEBACK, UNARMORED THREESPINE	FISH	E,CH	KNOWN
STURGEON, PALLID	FISH	E	KNOWN
STURGEON, SHORTNOSE	FISH	E	POSSIBLE
SUCKER, RAZORBACK	FISH	E,CH	KNOWN
TOPMINNOW, GILA (YAQUI)	FISH	E	POSSIBLE
TROUT, BULL (COLUMBIA RIVER POPULATION)	FISH	T	POSSIBLE
TROUT, LITTLE KERN GOLDEN	FISH	T,CH	KNOWN
BEETLE, AMERICAN BURYING	INSECT	E	POSSIBLE
BEETLE, VALLEY ELDERBERRY LONGHORN	INSECT	T,CH	KNOWN
BUTTERFLY, QUINO CHECKERSPOT	INSECT	E	POSSIBLE
BUTTERFLY, SMITH'S BLUE	INSECT	E	KNOWN
FLY, DELHI SANDS FLOWER-LOVING	INSECT	E	KNOWN
SNAIL, MORRO SHOULDERBAND	SNAIL	E	KNOWN

Leafy Vegetables
(Rhubarb)

Ag Census updated through: October 1, 1992
Species database updated through October 1 1992

Tuesday 05/16/00 14:19

Species in counties where **Rhubarb**, Harvested (acres) are grown.

CHUB, OREGON	FISH	E	KNOWN
SALMON, CHINOOK (SNAKE RIVER FALL RUN)	FISH	T	POSSIBLE
SALMON, CHINOOK (SNAKE RIVER SPRING/SUMMER)	FISH	T	POSSIBLE
STEELHEAD, LOWER COLUMBIA RIVER POPULATION	FISH	T	POSSIBLE
STEELHEAD, SNAKE RIVER BASIN POPULATION	FISH	T	POSSIBLE
TROUT, BULL (COLUMBIA RIVER POPULATION)	FISH	T	POSSIBLE

Leafy Vegetables
(Parsley)

Ag Census updated through: October 1, 1992
Species database updated through October 1 1992

Tuesday 05/16/00 14:18

Species in counties where **Parsley**, Harvested (acres) are grown.

FROG, CALIFORNIA RED-LEGGED	AMPHIBIAN	T	KNOWN
SALAMANDER, DESERT SLENDER	AMPHIBIAN	E	KNOWN
SALAMANDER, SANTA CRUZ LONG-TOED	AMPHIBIAN	E	KNOWN
TOAD, ARROYO SOUTHWESTERN	AMPHIBIAN	E	KNOWN
LINDERIELLA, CALIFORNIA	CRUSTACEAN	E	KNOWN
SHRIMP, CONSERVANCY FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, RIVERSIDE FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, VERNAL POOL FAIRY	CRUSTACEAN	T	KNOWN
CHUB, BONYTAIL	FISH	E,CH	POSSIBLE
GOBY, TIDEWATER	FISH	E	POSSIBLE
PUPFISH, DESERT	FISH	E,CH	KNOWN
SQUAWFISH, COLORADO	FISH	CH	POSSIBLE
STEELHEAD, SOUTH-CENTRAL CALIFORNIA POP	FISH	T	POSSIBLE
STEELHEAD, SOUTHERN CALIFORNIA POPULATION	FISH	E	POSSIBLE
STICKLEBACK, UNARMORED THREESPINE	FISH	E,CH	KNOWN
STURGEON, SHORTNOSE	FISH	E	KNOWN
SUCKER, RAZORBACK	FISH	E,CH	KNOWN
TOPMINNOW, GILA (YAQUI)	FISH	E	POSSIBLE
BUTTERFLY, QUINO CHECKERSPOT	INSECT	E	POSSIBLE
BUTTERFLY, SMITH'S BLUE	INSECT	E	KNOWN
FLY, DELHI SANDS FLOWER-LOVING	INSECT	E	KNOWN

Fruiting Vegetables
(Tomatoes)

Ag Census updated through: October 1, 1992
Species database updated through October 1 1992

Wednesday 02/09/00 12:06

Species in counties where **Tomatoes**, Harvested (acres)are grown.

FROG, CALIFORNIA RED-LEGGED	AMPHIBIAN	T	KNOWN
SALAMANDER, DESERT SLENDER	AMPHIBIAN	E	KNOWN
SALAMANDER, RED HILLS	AMPHIBIAN	T	KNOWN
SALAMANDER, SANTA CRUZ LONG-TOED	AMPHIBIAN	E	KNOWN
SALAMANDER, SONORA TIGER	AMPHIBIAN	E	POSSIBLE
TOAD, ARROYO SOUTHWESTERN	AMPHIBIAN	E	KNOWN
TOAD, HOUSTON	AMPHIBIAN	E,CH	KNOWN
AMPHIPOD, ILLINOIS CAVE	CRUSTACEAN	E	POSSIBLE
CRAYFISH, NASHVILLE	CRUSTACEAN	E	KNOWN
LINDERIELLA, CALIFORNIA	CRUSTACEAN	E	KNOWN
SHRIMP, CALIFORNIA FRESHWATER	CRUSTACEAN	E	KNOWN
SHRIMP, CONSERVANCY FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, KENTUCKY CAVE	CRUSTACEAN	E,CH	KNOWN
SHRIMP, LONGHORN FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, RIVERSIDE FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, SQUIRREL CHIMNEY CAVE	CRUSTACEAN	T	KNOWN
SHRIMP, VERNAL POOL FAIRY	CRUSTACEAN	T	KNOWN
SHRIMP, VERNAL POOL TADPOLE	CRUSTACEAN	E	KNOWN
CHUB, BONYTAIL	FISH	E,CH	KNOWN
CHUB, HUMPBACK	FISH	E,CH	KNOWN
CHUB, MOHAVE TUI	FISH	E	KNOWN
CHUB, OREGON	FISH	E	KNOWN
CHUB, SLENDER	FISH	T,CH	POSSIBLE
CHUB, SPOTFIN	FISH	T,CH	POSSIBLE
CHUB, VIRGIN RIVER	FISH	E	KNOWN
DACE, BLACKSIDE	FISH	T	KNOWN
DARTER, BOULDER	FISH	E	KNOWN
DARTER, FOUNTAIN	FISH	E,CH	POSSIBLE
DARTER, MARYLAND	FISH	E,CH	KNOWN
DARTER, RELICT	FISH	E	POSSIBLE
DARTER, SNAIL	FISH	T	KNOWN
DARTER, WATERCRESS	FISH	E	KNOWN
GOBY, TIDEWATER	FISH	E	POSSIBLE
LOGPERCH, ROANOKE	FISH	E	KNOWN
MADTOM, YELLOWFIN	FISH	TCHPXN	POSSIBLE
MINNOW, LOACH	FISH	T,CH	KNOWN
MINNOW, RIO GRANDE SILVERY	FISH	E	POSSIBLE
PUPFISH, DESERT	FISH	E,CH	KNOWN
SALMON, CHINOOK (SACRAMENTO RIVER WINTER RUN)	FISH	E	POSSIBLE
SALMON, CHINOOK (SNAKE RIVER FALL RUN)	FISH	T	POSSIBLE
SALMON, CHINOOK (SNAKE RIVER SPRING/SUMMER)	FISH	T	POSSIBLE
SALMON, COHO (CENTRAL CALIFORNIA COAST POP)	FISH	E	POSSIBLE
SALMON, COHO (SOUTHERN OR/NORTHERN CA COAST)	FISH	T	POSSIBLE
SHINER, CAPE FEAR	FISH	E,CH	KNOWN
SHRIMP, SAN DIEGO FAIRY	FISH	E	POSSIBLE
SMELT, DELTA	FISH	T	KNOWN

Fruiting Vegetables
(Tomatoes cont'd)

SPIKEDACE	FISH	T,CH	KNOWN
SQUAWFISH, COLORADO	FISH	CH	POSSIBLE
STEELHEAD, CALIFORNIA CENTRAL VALLEY POP	FISH	E	POSSIBLE
STEELHEAD, CENTRAL CALIFORNIA POPULATION	FISH	T	POSSIBLE
STEELHEAD, KLAMATH MOUNTAINS PROVINCE	FISH	T	POSSIBLE
STEELHEAD, LOWER COLUMBIA RIVER POPULATION	FISH	T	POSSIBLE
STEELHEAD, NORTHERN CALIFORNIA POPULATION	FISH	T	POSSIBLE
STEELHEAD, OREGON COAST POPULATION	FISH	T	POSSIBLE
STEELHEAD, SNAKE RIVER BASIN POPULATION	FISH	T	POSSIBLE
STEELHEAD, SOUTH-CENTRAL CALIFORNIA POP	FISH	T	POSSIBLE
STEELHEAD, SOUTHERN CALIFORNIA POPULATION	FISH	E	POSSIBLE
STEELHEAD, UPPER COLUMBIA RIVER POPULATION	FISH	E	POSSIBLE
STICKLEBACK, UNARMORED THREESPINE	FISH	E,CH	KNOWN
STURGEON, GULF	FISH	CH	KNOWN
STURGEON, PALLID	FISH	E	POSSIBLE
STURGEON, SHORTNOSE	FISH	E	KNOWN
SUCKER, JUNE	FISH	E,CH	KNOWN
SUCKER, RAZORBACK	FISH	E,CH	KNOWN
TOPMINNOW, GILA (YAQUI)	FISH	E	KNOWN
TROUT, APACHE	FISH	T	KNOWN
TROUT, BULL (COLUMBIA RIVER POPULATION)	FISH	T	POSSIBLE
TROUT, CUTTHROAT (UMPQUA RIVER POPULATION)	FISH	E	POSSIBLE
TROUT, LAHONTAN CUTTHROAT	FISH	T	KNOWN
TROUT, LITTLE KERN GOLDEN	FISH	T,CH	POSSIBLE
TROUT, PAIUTE CUTTHROAT	FISH	T	POSSIBLE
BEETLE, AMERICAN BURYING	INSECT	E	KNOWN
BEETLE, DELTA GREEN GROUND	INSECT	T,CH	KNOWN
BEETLE, HUNGERFORD'S CRAWLING WATER	INSECT	E	POSSIBLE
BEETLE, MOUNT HERMON JUNE	INSECT	E	POSSIBLE
BEETLE, NORTHEASTERN BEACH TIGER	INSECT	T	KNOWN
BEETLE, PURITAN TIGER	INSECT	T	KNOWN
BEETLE, VALLEY ELDERBERRY LONGHORN	INSECT	T,CH	KNOWN
BUTTERFLY, BAY CHECKERSPOT	INSECT	T,CH	KNOWN
BUTTERFLY, BEHREN'S SILVERSPOT	INSECT	E	KNOWN
BUTTERFLY, EL SEGUNDO BLUE	INSECT	E	KNOWN
BUTTERFLY, KARNER BLUE	INSECT	E	KNOWN
BUTTERFLY, LANGE'S METALMARK	INSECT	E	KNOWN
BUTTERFLY, LOTIS BLUE	INSECT	E	KNOWN
BUTTERFLY, MITCHELL'S SATYR	INSECT	E	KNOWN
BUTTERFLY, MYRTLE'S SILVERSPOT	INSECT	E	KNOWN
BUTTERFLY, OREGON SILVERSPOT	INSECT	T,CH	KNOWN
BUTTERFLY, PALOS VERDES BLUE	INSECT	E,CH	KNOWN
BUTTERFLY, QUINO CHECKERSPOT	INSECT	E	POSSIBLE
BUTTERFLY, SCHAUS SWALLOWTAIL	INSECT	E	KNOWN
BUTTERFLY, SMITH'S BLUE	INSECT	E	KNOWN
DRAGONFLY, HINES EMERALD	INSECT	E	KNOWN
FLY, DELHI SANDS FLOWER-LOVING	INSECT	E	KNOWN
GRASSHOPPER, ZAYANTE BAND-WINGED	INSECT	E	POSSIBLE
MOTH, KERN PRIMROSE SPHINX	INSECT	T	KNOWN
SKIPPER, LAGUNA MOUNTAIN	INSECT	E	POSSIBLE
AMBERSNAIL, KANAB	SNAIL	E	KNOWN
SNAIL, MORRO SHOULDERBAND	SNAIL	E	KNOWN
SNAIL, TULOTOMA	SNAIL	E	KNOWN

Fruiting Vegetables
(Sweet Peppers)

Ag Census updated through: October 1, 1992
Species database updated through October 1 1992

Wednesday 02/09/00 12:05

Species in counties where **Sweet peppers**, Harvested (acre) are grown.

FROG, CALIFORNIA RED-LEGGED	AMPHIBIAN	T	KNOWN
SALAMANDER, DESERT SLENDER	AMPHIBIAN	E	KNOWN
SALAMANDER, SANTA CRUZ LONG-TOED	AMPHIBIAN	E	KNOWN
SALAMANDER, SONORA TIGER	AMPHIBIAN	E	POSSIBLE
TOAD, ARROYO SOUTHWESTERN	AMPHIBIAN	E	KNOWN
LINDERIELLA, CALIFORNIA	CRUSTACEAN	E	KNOWN
SHRIMP, CALIFORNIA FRESHWATER	CRUSTACEAN	E	KNOWN
SHRIMP, CONSERVANCY FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, KENTUCKY CAVE	CRUSTACEAN	E,CH	KNOWN
SHRIMP, LONGHORN FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, RIVERSIDE FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, SQUIRREL CHIMNEY CAVE	CRUSTACEAN	T	KNOWN
SHRIMP, VERNAL POOL FAIRY	CRUSTACEAN	T	KNOWN
SHRIMP, VERNAL POOL TADPOLE	CRUSTACEAN	E	KNOWN
CATFISH, YAQUI	FISH	T,CH	KNOWN
CHUB, BONYTAIL	FISH	E,CH	POSSIBLE
CHUB, HUMPBACK	FISH	E,CH	KNOWN
CHUB, OREGON	FISH	E	KNOWN
CHUB, SPOTFIN	FISH	T,CH	POSSIBLE
CHUB, YAQUI	FISH	E,CH	KNOWN
DACE, BLACKSIDE	FISH	T	KNOWN
DARTER, BOULDER	FISH	E	KNOWN
DARTER, SLACKWATER	FISH	T,CH	KNOWN
DARTER, SNAIL	FISH	T	POSSIBLE
DARTER, WATERCRESS	FISH	E	POSSIBLE
GAMBUSIA, PECOS	FISH	E	KNOWN
GOBY, TIDEWATER	FISH	E	POSSIBLE
MADTOM, SCIOTO	FISH	E	POSSIBLE
MINNOW, RIO GRANDE SILVERY	FISH	E	POSSIBLE
PUPFISH, DESERT	FISH	E,CH	KNOWN
SALMON, CHINOOK (SACRAMENTO RIVER WINTER RUN)	FISH	E	KNOWN
SALMON, CHINOOK (SNAKE RIVER FALL RUN)	FISH	T	POSSIBLE
SALMON, CHINOOK (SNAKE RIVER SPRING/SUMMER)	FISH	T	POSSIBLE
SALMON, COHO (CENTRAL CALIFORNIA COAST POP)	FISH	E	POSSIBLE
SHINER, BEAUTIFUL	FISH	T,CH	KNOWN
SHINER, PECOS BLUNTNOSE	FISH	T,CH	KNOWN
SMELT, DELTA	FISH	T	KNOWN
SQUAWFISH, COLORADO	FISH	CH	POSSIBLE
STEELHEAD, CALIFORNIA CENTRAL VALLEY POP	FISH	E	POSSIBLE
STEELHEAD, CENTRAL CALIFORNIA POPULATION	FISH	T	POSSIBLE
STEELHEAD, KLAMATH MOUNTAINS PROVINCE	FISH	T	KNOWN
STEELHEAD, LOWER COLUMBIA RIVER POPULATION	FISH	T	POSSIBLE
STEELHEAD, NORTHERN CALIFORNIA POPULATION	FISH	T	POSSIBLE
STEELHEAD, OREGON COAST POPULATION	FISH	T	POSSIBLE
STEELHEAD, SNAKE RIVER BASIN POPULATION	FISH	T	POSSIBLE
STEELHEAD, SOUTH-CENTRAL CALIFORNIA POP	FISH	T	POSSIBLE
STEELHEAD, SOUTHERN CALIFORNIA POPULATION	FISH	E	POSSIBLE

Fruiting Vegetables
(Sweet Peppers cont'd.)

STEELHEAD, UPPER COLUMBIA RIVER POPULATION	FISH	E	POSSIBLE
STICKLEBACK, UNARMORED THREESPINE	FISH	E,CH	KNOWN
STURGEON, GULF	FISH	CH	KNOWN
STURGEON, PALLID	FISH	E	POSSIBLE
STURGEON, SHORTNOSE	FISH	E	KNOWN
SUCKER, RAZORBACK	FISH	E,CH	KNOWN
TOPMINNOW, GILA (YAQUI)	FISH	E	KNOWN
TROUT, BULL (COLUMBIA RIVER POPULATION)	FISH	T	POSSIBLE
TROUT, CUTTHROAT (UMPQUA RIVER POPULATION)	FISH	E	POSSIBLE
TROUT, LAHONTAN CUTTHROAT	FISH	T	KNOWN
TROUT, LITTLE KERN GOLDEN	FISH	T,CH	POSSIBLE
TROUT, PAIUTE CUTTHROAT	FISH	T	POSSIBLE
BEETLE, AMERICAN BURYING	INSECT	E	POSSIBLE
BEETLE, MOUNT HERMON JUNE	INSECT	E	POSSIBLE
BEETLE, NORTHEASTERN BEACH TIGER	INSECT	T	KNOWN
BEETLE, PURITAN TIGER	INSECT	T	KNOWN
BEETLE, VALLEY ELDERBERRY LONGHORN	INSECT	T,CH	KNOWN
BUTTERFLY, BAY CHECKERSPOT	INSECT	T,CH	KNOWN
BUTTERFLY, BEHREN'S SILVERSPOT	INSECT	E	KNOWN
BUTTERFLY, KARNER BLUE	INSECT	E	KNOWN
BUTTERFLY, LANGE'S METALMARK	INSECT	E	KNOWN
BUTTERFLY, MITCHELL'S SATYR	INSECT	E	KNOWN
BUTTERFLY, MYRTLE'S SILVERSPOT	INSECT	E	KNOWN
BUTTERFLY, QUINO CHECKERSPOT	INSECT	E	POSSIBLE
BUTTERFLY, SCHAUS SWALLOWTAIL	INSECT	E	KNOWN
BUTTERFLY, SMITH'S BLUE	INSECT	E	KNOWN
DRAGONFLY, HINES EMERALD	INSECT	E	KNOWN
FLY, DELHI SANDS FLOWER-LOVING	INSECT	E	KNOWN
GRASSHOPPER, ZAYANTE BAND-WINGED	INSECT	E	POSSIBLE
MOTH, KERN PRIMROSE SPHINX	INSECT	T	KNOWN
SNAIL, MORRO SHOULDERBAND	SNAIL	E	KNOWN

Fruiting Vegetables
(Hot Peppers)

Ag Census updated through: October 1, 1992
Species database updated through October 1 1992

Wednesday 02/09/00 12:01

Species in counties where **Hot peppers**, Harvested (acres) are grown.

FROG, CALIFORNIA RED-LEGGED	AMPHIBIAN	T	KNOWN
SALAMANDER, DESERT SLENDER	AMPHIBIAN	E	KNOWN
SALAMANDER, SANTA CRUZ LONG-TOED	AMPHIBIAN	E	KNOWN
TOAD, ARROYO SOUTHWESTERN	AMPHIBIAN	E	KNOWN
ISOPOD, SOCORRO	CRUSTACEAN	E	KNOWN
LINDERIELLA, CALIFORNIA	CRUSTACEAN	E	KNOWN
SHRIMP, CALIFORNIA FRESHWATER	CRUSTACEAN	E	KNOWN
SHRIMP, CONSERVANCY FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, LONGHORN FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, RIVERSIDE FAIRY	CRUSTACEAN	E	KNOWN

Fruiting Vegetables
(Hot Peppers cont'd)

SHRIMP, VERNAL POOL FAIRY	CRUSTACEAN	T	KNOWN
SHRIMP, VERNAL POOL TADPOLE	CRUSTACEAN	E	KNOWN
CATFISH, YAQUI	FISH	T,CH	KNOWN
CHUB, BONYTAIL	FISH	E,CH	POSSIBLE
CHUB, HUMPBACK	FISH	E,CH	KNOWN
CHUB, MOHAVE TUI	FISH	E	KNOWN
CHUB, YAQUI	FISH	E,CH	KNOWN
GAMBUSIA, PECOS	FISH	E	KNOWN
GOBY, TIDEWATER	FISH	E	POSSIBLE
MINNOW, LOACH	FISH	T,CH	KNOWN
MINNOW, RIO GRANDE SILVERY	FISH	E	KNOWN
PUPFISH, DESERT	FISH	E,CH	KNOWN
SALMON, CHINOOK (SACRAMENTO RIVER WINTER RUN)	FISH	E	KNOWN
SALMON, COHO (CENTRAL CALIFORNIA COAST POP)	FISH	E	POSSIBLE
SHINER, BEAUTIFUL	FISH	T,CH	KNOWN
SHINER, PECOS BLUNTNOSE	FISH	T,CH	KNOWN
SMELT, DELTA	FISH	T	KNOWN
SPIKEDACE	FISH	T,CH	KNOWN
SQUAWFISH, COLORADO	FISH	CH	POSSIBLE
STEELHEAD, CALIFORNIA CENTRAL VALLEY POP	FISH	E	POSSIBLE
STEELHEAD, CENTRAL CALIFORNIA POPULATION	FISH	T	POSSIBLE
STEELHEAD, NORTHERN CALIFORNIA POPULATION	FISH	T	POSSIBLE
STEELHEAD, SOUTH-CENTRAL CALIFORNIA POP	FISH	T	POSSIBLE
STEELHEAD, SOUTHERN CALIFORNIA POPULATION	FISH	E	POSSIBLE
STEELHEAD, UPPER COLUMBIA RIVER POPULATION	FISH	E	POSSIBLE
STICKLEBACK, UNARMORED THREESPINE	FISH	E,CH	KNOWN
STURGEON, GULF	FISH	CH	KNOWN
STURGEON, PALLID	FISH	E	POSSIBLE
STURGEON, SHORTNOSE	FISH	E	POSSIBLE
SUCKER, RAZORBACK	FISH	E,CH	KNOWN
TOPMINNOW, GILA (YAQUI)	FISH	E	KNOWN
TROUT, APACHE	FISH	T	KNOWN
TROUT, BULL (COLUMBIA RIVER POPULATION)	FISH	T	POSSIBLE
TROUT, GILA	FISH	E	KNOWN
TROUT, LITTLE KERN GOLDEN	FISH	T,CH	POSSIBLE
TROUT, PAIUTE CUTTHROAT	FISH	T	POSSIBLE
BEETLE, VALLEY ELDERBERRY LONGHORN	INSECT	T,CH	KNOWN
BUTTERFLY, BAY CHECKERSPOT	INSECT	T,CH	KNOWN
BUTTERFLY, BEHREN'S SILVERSPOT	INSECT	E	KNOWN
BUTTERFLY, KARNER BLUE	INSECT	E	KNOWN
BUTTERFLY, MITCHELL'S SATYR	INSECT	E	KNOWN
BUTTERFLY, MYRTLE'S SILVERSPOT	INSECT	E	KNOWN
BUTTERFLY, QUINO CHECKERSPOT	INSECT	E	POSSIBLE
BUTTERFLY, SCHAUS SWALLOWTAIL	INSECT	E	KNOWN
BUTTERFLY, SMITH'S BLUE	INSECT	E	KNOWN
FLY, DELHI SANDS FLOWER-LOVING	INSECT	E	KNOWN
MOTH, KERN PRIMROSE SPHINX	INSECT	T	KNOWN
SNAIL, MORRO SHOULDERBAND	SNAIL	E	KNOWN
SPRINGSNAIL, ALAMOSA	SNAIL	E	KNOWN
SPRINGSNAIL, SOCORRO	SNAIL	E	KNOWN

Fruiting Vegetables
(Pimientos)

Ag Census updated through: October 1, 1992
Species database updated through October 1 1992

Wednesday 02/09/00 12:03

Species in counties where **Pimientos**, Harvested (acres)are grown.

DARTER, BOULDER	FISH	E	KNOWN
DARTER, SLACKWATER	FISH	T,CH	KNOWN
DARTER, SNAIL	FISH	T	KNOWN

Fruiting Vegetables
(Eggplant)

Ag Census updated through: October 1, 1992
Species database updated through October 1 1992

Wednesday 02/09/00 12:01

Species in counties where **Eggplant**, Harvested (acres)are grown.

SALAMANDER, DESERT SLENDER	AMPHIBIAN	E	KNOWN
TOAD, ARROYO SOUTHWESTERN	AMPHIBIAN	E	KNOWN
LINDERIELLA, CALIFORNIA	CRUSTACEAN	E	KNOWN
SHRIMP, CONSERVANCY FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, RIVERSIDE FAIRY	CRUSTACEAN	E	KNOWN
SHRIMP, SQUIRREL CHIMNEY CAVE	CRUSTACEAN	T	KNOWN
SHRIMP, VERNAL POOL FAIRY	CRUSTACEAN	T	KNOWN
SHRIMP, VERNAL POOL TADPOLE	CRUSTACEAN	E	KNOWN
CHUB, BONYTAIL	FISH	E,CH	POSSIBLE
MINNOW, RIO GRANDE SILVERY	FISH	E	KNOWN
PUPFISH, DESERT	FISH	E,CH	KNOWN
SALMON, CHINOOK (SNAKE RIVER FALL RUN)	FISH	T	POSSIBLE
SALMON, CHINOOK (SNAKE RIVER SPRING/SUMMER)	FISH	T	KNOWN
SMELT, DELTA	FISH	T	KNOWN
SQUAWFISH, COLORADO	FISH	CH	POSSIBLE
STEELHEAD, CALIFORNIA CENTRAL VALLEY POP	FISH	E	POSSIBLE
STEELHEAD, SNAKE RIVER BASIN POPULATION	FISH	T	POSSIBLE
STEELHEAD, UPPER COLUMBIA RIVER POPULATION	FISH	E	POSSIBLE
STURGEON, GULF	FISH	CH	KNOWN
STURGEON, SHORTNOSE	FISH	E	KNOWN
SUCKER, RAZORBACK	FISH	E,CH	KNOWN
TROUT, BULL (COLUMBIA RIVER POPULATION)	FISH	T	POSSIBLE
TROUT, LITTLE KERN GOLDEN	FISH	T,CH	POSSIBLE
TROUT, PAIUTE CUTTHROAT	FISH	T	POSSIBLE
BEETLE, NORTHEASTERN BEACH TIGER	INSECT	T	KNOWN
BEETLE, PURITAN TIGER	INSECT	T	KNOWN
BEETLE, VALLEY ELDERBERRY LONGHORN	INSECT	T,CH	KNOWN
BUTTERFLY, MITCHELL'S SATYR	INSECT	E	KNOWN
BUTTERFLY, QUINO CHECKERSPOT	INSECT	E	POSSIBLE
BUTTERFLY, SCHAUS SWALLOWTAIL	INSECT	E	KNOWN
FLY, DELHI SANDS FLOWER-LOVING	INSECT	E	KNOWN