



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Maximum Number of Crop Cycles Per Year in California for Methomyl Use Sites.

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Methomyl is one of many pesticides undergoing an endangered species assessment under litigation involving California's Red Legged Frog. The Environmental Fate and Effects Division requires crop information for all methomyl use sites so that the maximum potential use of methomyl can be determined. Currently, methomyl labels refer to applications on a per season basis. This makes it impossible to determine the maximum number of applications per year without understanding the total number of times a crop can be grown in a year.

The maximum number of times a crop can be grown on the same field in one year in California for all methomyl use sites was researched and is provided in the Table 1. The maximum number of crop cycles that can be grown on an acre on land was based on the normal planting and harvest dates, crop length taking into account soil preparation, and climatic requirements. Sources of information included official publications by California state experts, national crop publications, and personal communication with the Western Integrated Pest Management (IPM) Center director. First, BEAD compiled the

crop table with published information only. Then, BEAD sent the draft table to the director of the Western IPM Center for review and refinement.

Table 1. Maximum number of crops cycles per year in California for methomyl use sites.

USE SITE	MAXIMUM NUMBER OF CROPS CYCLES PER YEAR IN CA
Alfalfa	Perennial crop with stands living 3-5 years having 2-9 cuttings /yr ^{A,F}
Anise (Fennel)	Normally up to 2 crops / yr ^{NN} .
Apple (ground only)	One crop per year
Asparagus	One crop per year, harvested every 1 to 3 days over a 3 to 4 week period. Once established, asparagus fields remain in production for 8-10 years. ^G
Avocado	Evergreen trees that produce one crop per year for up to 50 years ^B
Barley	Primarily a fall crop, generally grown 1/yr as a rotation crop ^C
Beans, Succulent (lima, snap, wax, broad, fava, asparagus beans)	Snap beans have a fall and spring crop in desert areas. Because of disease and insect pest problems, succulent beans are typically not planted back to back. ^D ; normally grown once per year ^{NN}
Sweet Lupine, White Sweet Lupine, White Lupine, Grain Lupine	One crop per year ^O
Beans, Dry (kidney, mung, Navy, pinto, blackeyed peas, cowpeas, Red)	One crop per year ^{NN} .
Beans ^{SLN} (interplanted with nonbearing almonds, plums, prunes, peaches, and walnuts) (CA-770431)	One crop per year ^{NN} .
Beets (table)	Two crops per year. Rotate to lettuce ^{NN} .
Bermudagrass (pasture)	Perennial crop. Pastures are not cut. Hayfields may have 4-5 cuttings/ season ^A
Blueberries (ground only)	Perennial shrub with 1 crop/ yr ^A
Broccoli	Imperial Valley: 1 crop per year Coastal Valleys: 2 or more crops /yr San Joaquin Valley: 2 crops/yr ^{H,I} Never back to back, rotate with lettuce ^{NN} .
Broccoli, Chinese ^{SLN} (CA-860059)	Each plant may be harvested multiple times per year ^A Although rarely harvested multiple times due to quality degradation ^{NN} .
Broccoli Raab ^{SLN} (CA-900034)	Similar to broccoli ^P . Not planted back to back ^{NN} .
Brussels Sprouts	1 crop / yr ^J
Cabbage	Up to 3 crops/ yr depending on region and variety ^{K, NN}

USE SITE	MAXIMUM NUMBER OF CROPS CYCLES PER YEAR IN CA
Carrot	One crop per year, generally 1 crop is planted every 3 years in the same field ^L
Cauliflower	Coastal region: 2 or more crops / yr Desert and San Joaquin Valley: 1/yr ^M Rotate to lettuce ^{NN}
Celery	2.5 crops/acre/yr ^N
Chicory	San Joaquin Valley: 2/yr Desert: 1/yr ^{A,Q}
Chinese Cabbage	See cabbage ^{A,K}
Collards (fresh market only)	2-3 crops per year ^{NN} .
Corn (field and popcorn)	One crop per year ^{NN} .
Corn (seed)	Similar to field corn ^{NN} .
Corn (sweet)	Normally, 2-3 crops/year in rotation with other crops ^{NN} . Southern desert valley: 2/yr; other regions: 1/yr ^U .
Corn	See other corn entries above.
Cotton	One crop per year ^R
Cucumber	One crop /yr ^S
Eggplant	One crop /yr ^T
Endive, Escarole	Similar to lettuce ^A
Garlic	One crop per year ^A
Grapefruit	One crop per year ^A
Grapes	One crop per year
Horseradish (ground Only)	One crop per year ^{LL}
Leafy Green Vegetables (beet tops, dandelions, kale, mustard greens, parsley, Swiss chard, turnip greens)	Dandelion, parsley, Swiss chard may have multiple harvests. Others have 3-4 crops per year in rotation with other crops ^{NN} .
Lemon	One crop per year ^A
Lentils	One crop per year ^{NN} .
Lettuce (head varieties)	Central Coast: up to 2 crops / yr ^V ; 1-2 per year in rotation ^{NN} . Central Valley: 2 crops / yr ^V ; 1-2 per year in rotation ^{NN} . Other regions: 1 crop / yr ^V .
Lettuce (leaf varieties)	San Joaquin Valley: 2/yr ^{A,Q} ; Normally, 1-2 per year in rotation ^{NN} . Desert: 1/yr ^{A,Q}
Melons (cantaloupe, casaba, Santa Claus, Crenshaw, honeydew, honey balls, Persian,	Central valley has 1 crop / yr Desert area of southern CA has a spring and a fall crop (normally in different fields) of cantaloupe & honeydew and a spring crop of watermelons. 1 crop / yr ^E .

USE SITE	MAXIMUM NUMBER OF CROPS CYCLES PER YEAR IN CA
golden pershaw, mango melon, pineapple melon, snake, watermelon)	
Mint (peppermint, spearmint)	Perennial crop plantings last approx 6 yrs. Peppermint has 1 cutting/yr; Spearmint has up to 2 cuttings/yr ^A
Nectarine	One crop per year ^A
Nonbearing Fruit, Grape, and Nut Nursery Stock (field grown) ^{SLN} (CA-770308)	Depending on crop, may be one crop / year; or one crop grown over several years.
Oats	May be either a fall crop or a spring crop ^{GG} . Normally, one crop per year ^{NN} .
Onions (green)	Three crops /yr ^W . Normally, grown in rotation with other crops ^{NN} .
Onions (dry bulb)	One crop per year ^{A,X}
Oranges	One crop per year ^A
Peaches	One crop per year
Peanuts	Peanuts not grown in CA according to USDA NASS.
Pears (Northeast only)	One crop per year
Peas, succulent (pigeon peas, chick, garbanzo, dwarf peas, garden peas, green peas, English peas, Field peas, edible pod peas)	Normally one crop per year. May have multiple plantings to extend harvest, but on different plots ^{A,Y, NN} .
Pecans (Southeast only)	One crop per year
Peppers (bell, hot, pimentos, sweet)	One crop per year ^{Z, NN} .
Pomegranates	One crop per year ^{MM}
Potato	One crop per year ^{AA}
Pumpkins ^{SLN} (CA-910011) (San Joaquin, Stanislaus, Merced, Sacramento, and Riverside Counties)	One crop per year ^{BB}
Radishes ^{SLN} (CA-770495)	3-5 radish crops per year in rotation with other crops ^{NN} .
Rye	Small acreage grown in CA. 1/yr grown mostly for hay ^{NN} .
Sorghum (except sweet sorghum)	Sorghum for grain has 1 crop /yr and hay may be cut several times per year ^{NN} .
Soybeans	Small acreage grown in CA. One crop per year ^{NN} .
Soybeans ^{SLN} (interplanted)	Not grown in CA ^{NN} .

USE SITE	MAXIMUM NUMBER OF CROPS CYCLES PER YEAR IN CA
with nonbearing almonds, plums, prunes, peaches, and walnuts) (CA-770431)	
Spinach	Normally, fresh spinach harvest the whole plant. 2-3 crops per year may be planted back to back. Processing spinach may be cut multiple times for 1-2 crops per year ^{NN, CC} .
Strawberry	One crop /yr with harvest period lasting several months ^{A, II}
Sugar Beet	One crop per year ^{NN, JJ} .
Summer Squash (crookneck, straightneck, scallop, vegetable marrow, spaghetti, hyotan, cucuzza, hechima, Chinese okra, bitter melon, balsam pear, balsam apple, Chinese cucumber)	One crop per year ^{DD}
Sweet Potatoes ^{SNL} (Aerial only) (CA-780136)	One crop per year ^{EE}
Tangelo, Tangerine	One crop per year ^A
Tobacco (except shade)	Not grown in CA ^{NN} .
Tomato	One crop per year ^{FF}
Tomatillo	One crop per year ^{KK}
Turf (sod farms only)	Up to 2 crops / year ^{NN} . Generally one crop per year.
Wheat	One crop per year ^{HH}

SLN = Special Local Need. This use site is registered under a special local need and not a section 3 registration for California.

References:

- A. Markle, G.M., J.J. Barn, B.A. Schneider, 1998. Food and feed crops of the United States. Meister Publishing Co., Willoughby, Ohio.
- B. California Avocado Commission, California Minor Crops Council, 2003. A pest management strategic plan for avocado production in California. Online: <http://www.ipmcenters.org/pmsp/pdf/CAavocado.pdf>
- C. Jackson, L.F. and L.W. Gallagher. California: Barley production. University of California. Online: <http://wheat.pw.usda.gov/ggpages/BarleyNewsletter/47/CABNL47.htm>
- D. Aguiar, J., F. Laemmle, A. Baameur, K. Mayberry. Snap bean production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7240. <http://anrcatalog.ucdavis.edu/pdf/7240.pdf>.
- E. LeBoeuf, J., 2002. Crop time line for cantaloupes, honeydews, and watermelons in California. Online: <http://pestdata.ncsu.edu/croptimelines/pdf/Camelon.pdf>
- F. University of California Alfalfa & Forages. Online: <http://alfalfa.ucdavis.edu/>

- G. Mayberry and Laemmlen. Asparagus production in California. Vegetable Research and Information Center. University of California Division of Agriculture and Natural Resources. Publication 7234. Online: <http://anrcatalog.ucdavis.edu/pdf/7234.pdf>
- H. LeStrange, M. K.S. Mayberry, S. T. Koike, J. Valencia. Broccoli production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7211. Online: <http://anrcatalog.ucdavis.edu/pdf/7211.pdf>.
- I. Crop profile for broccoli in California, 1999. Online: <http://www.ipmcenters.org/cropprofiles/docs/cabroccoli.html>
- J. Crop profile for Brussels sprouts in California, 1999. Online: <http://www.ipmcenters.org/cropprofiles/docs/cabrusselssprouts.html>
- K. Crop profile for cabbage in California, 2000. Online: <http://www.ipmcenters.org/cropprofiles/docs/cacabbage.html>; Mayberry, K.S., F.F. Laemmlen, V.E. Rubatzky. Cabbage production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7208. Online: <http://anrcatalog.ucdavis.edu/pdf/7208.pdf>
- L. California Fresh Carrot Advisory Board, California Minor Crops Council, 2005. A pest management strategic plan for fresh carrot production in California. Online: <http://www.ipmcenters.org/pmsp/pdf/CACarrot.pdf>
- M. Crop profile for cauliflower in California, 2000. Online: <http://www.ipmcenters.org/cropprofiles/docs/cacauliflower.html>
- N. Crop profile for celery in California, 2000. Online: <http://www.ipmcenters.org/cropprofiles/docs/cacelery.html>
- O. Putnam, D.H., E.S. Oplinger, L.L. Hardman, J.D. Doll, 1997. Alternative field crops manual: Lupine. University of Wisconsin; University of Minnesota. Online: <http://www.hort.purdue.edu/newcrop/afcm/lupine.html>
- P. Crop Profile for Rapini in California, 2000. Online: <http://www.ipmcenters.org/cropprofiles/docs/carapini.html>
- Q. Crop Profile for Leaf Lettuce in California, 2001. Online: <http://www.ipmcenters.org/cropprofiles/docs/calettuce-leaf.html>
- R. Crop Profile for Cotton in California, 2002. Online: <http://www.ipmcenters.org/cropprofiles/docs/CAcotton.html>
- S. Schader, W.L., J.L. Aguiar, A.S. Mayberry, Cucumber Production in California. University of California Agriculture and Natural Resources, Publication 8050. Online: <http://anrcatalog.ucdavis.edu/pdf/8050.pdf>
- T. Aguiar, J. and Valencia, J. Eggplant production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7235. Online: <http://anrcatalog.ucdavis.edu/pdf/7235.pdf>
- U. Smith, R., J. Aguiar, J. Cprile. Sweet corn production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7223. Online: <http://anrcatalog.ucdavis.edu/pdf/7223.pdf>
- V. Jackson, L., Laemmlen, F., Koike, S., Schulbach, K., Chaney, W. Iceberg lettuce production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7215. Online: <http://anrcatalog.ucdavis.edu/pdf/7215.pdf>.
- W. Voss, R.E. and K.S. Mayberry. Green onion production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7243. Online: <http://anrcatalog.ucdavis.edu/pdf/7243.pdf>
- X. Voss, R.E. and K.S. Mayberry. Fresh-market bulb onion production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7242. Online: <http://anrcatalog.ucdavis.edu/pdf/7242.pdf>
- Y. Gaskell, M. Edible-pod pea production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7233. Online: <http://anrcatalog.ucdavis.edu/pdf/7233.pdf>
- Z. Harts, T.K., M. LeStrange, K.S. Mayberry, R.F. Smith. Bell pepper production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7217. Online: <http://anrcatalog.ucdavis.edu/pdf/7217.pdf>
- AA. Voss, R.E., D.N. Wright, V.H. Schweer, J.C. Bishop, A. Harvey, K.G. Baghott, M.J. Snyder. Areas of potato production in California. University of California Vegetable Research and Information Center. Online: <http://vric.ucdavis.edu/veginfo/commodity/potato/PotatoinCA.pdf>

- BB. Gaskell, M. and R. Smith. Pumpkin production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7222. Online: <http://anrcatalog.ucdavis.edu/pdf/7222.pdf>
- CC. LeStrange, M., S. Koike, J. Valencia, W. Chaney. Spinach production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7212. Online: <http://anrcatalog.ucdavis.edu/pdf/7212.pdf>.
- DD. Molinar, R., J. Aguiar, M. Gaskell, K. Mayberry. Summer squash production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7245. Online: <http://anrcatalog.ucdavis.edu/pdf/7245.pdf>.
- EE. May, D. Sweet potato production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7237. Online: <http://anrcatalog.ucdavis.edu/pdf/7237.pdf>.
- FF. LeStrange, M., W.L. Schrader, T.K. Hartz. Fresh-market tomato production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 8017. Online: <http://anrcatalog.ucdavis.edu/pdf/8017.pdf>.
- GG. Jackson, L.F., 2006. Small grains: Characteristics of oat cultivars grown in California. UC Pest Management Guidelines. Online: <http://www.ipm.ucdavis.edu/PMG/r730000411.html>.
- HH. Crop profiles for wheat in California, 2002. Online: <http://www.ipmcenters.org/cropprofiles/docs/cawheat.html>.
- II. The California Strawberry Commission and The California Minor Crops Council, 2003 A pest management strategic plan for strawberry production in California. Online: <http://www.ipmcenters.org/pmsp/pdf/CASTRAWBERRY.PDF>.
- JJ. Crop profile for sugar beets in California, 1999. California Beet Growers Association. Online: <http://www.ipmcenters.org/cropprofiles/docs/casugarbeets.html>.
- KK. Smith, R. and M. Jimenez. Tomatillo production in California. Vegetable Research and Information Center. Vegetable Production Series Publication 7246. Online: <http://anrcatalog.ucdavis.edu/pdf/7246.pdf>.
- LL. Virginia Cooperative Extension, 2005. Specialty crops profile: Horseradish. Online: <http://www.ext.vt.edu/news/periodicals/commhort/pulledarticles/2005-11/specialtycropsprofile.html>.
- MM. LaRue, J.H., 1980. Growing pomegranates in California. Fruit and Nut Research and Information Center. DANR Publication Leaflet 2459. Online: http://fruitsandnuts.ucdavis.edu/crops/pomegranate_factsheet.shtml.
- NN. Melnicoe, R., Personal communication, February, 2007; and Ratto, R. personal communication via R. Melnicoe, February 2007.