BMPs for Water Quality

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Publication Number 31-075C

(Updated Feb 2012)

Water quality should be important to all of us, especially if water is in short supply. Farming practices can have major impacts on water quality, either improving or degrading it. Fortunately, vegetable and fruit growers have a wide variety of tools available when it comes to managing and improving farm water quality.

IRRIGATION

Irrigation management is critical to water quality, as well as to plant health and good yields. Overwatering is bad for plant health, as is under-watering. Both are stressors on the plants which can impact plant health as well as crop quality and yield.

Monitoring and calibrating your irrigation system at least once a season is critical to proper irrigation management. Your goal is to apply adequate water to meet crop needs without over-irrigating or irrigating to runoff. Factor in the season, weather, and plant growth stage when scheduling irrigations and determining set times.

Monitoring plant signs as well soil moisture can help you determine when to irrigate. Using soil moisture by feel (http://www.mt.nrcs.usda.gov/technical/ecs/agronomy/soilmoisture/index.html) or monitoring equipment such as tensiometers or matrix/electrical resistance blocks (http://www.attra.org/attra-pub/PDF/soil_moisture.pdf) can help you learn about your soil and crop water needs. Consider using the California Irrigation Management Information System (CIMIS http://www.ipm.ucdavis.edu/WEATHER/wxretrieve.html) or programs such as http://www.wateright.org/ to help schedule your irrigation.

If you are planning a new irrigation system or thinking about changing your old one, plan for low volume irrigation systems. Low volume systems measure output in gallons per hour, not gallons per minute, and are often the best choice for vegetable and fruit crops. Call your local Natural Resource Conservation Service (NRCS) or county Resource Conservation District (RCD) for help deciding on the best system for you.

INTEGRATED PEST MANAGEMENT

Pesticide use often impacts water quality. Use Integrated Pest Management (IPM) practices such as pruning, timing of disking or mowing, removal of habitat, releasing natural enemies, etc. rather than pesticides. For more information on alternative management, go to http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html

If you need to use a pesticide, choose a reduced risk pesticide instead of using carbamates, pyrethroids, or organophosphates. Use copper only if you have no other alternative, and avoid using dormant season pesticides that can create water quality issues.

BEST PRACTICES FOR SPRAYING:

- Spray after rain to avoid washoff.
- Do not spray in breezy conditions to avoid drift.
- Calibrate your sprayers so you are spraying what is needed.
- Consider spraying alternate rows for insect pests such as thrips and leafhoppers.
- Spray hotspots instead of the whole orchard or field, e.g. *Citricola*, California red scale.

CHOOSE ALTERNATIVE MATERIALS TO PROTECT WATER QUALITY:

Codling moth in apples & pears: use Assail, Spinosad or Cyd-X granulovirus in place of Imidan or Guthion.

Oriental Fruit Moth in stone fruit: use mating disruption, Spinosad or an Insect Growth Regulator (e.g. Intrepid) instead of Imidan, Asana, or Sevin.

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http://ucanr.org/sites/ceplacerhorticulture · http://ucanr.org/foothillfarming

United States Department of Agriculture, University of California, Placer and Nevada Counties cooperating.

Peach twig borer: use oil and Spinosad instead of oil and Asana.

Citrus red scale, Citricola scale: use oil, imidacloprid, or Applaud instead of Lorsban

Copper alternatives

For dormant sprays – choose Bordeaux mix, which is less susceptible to being washed off by rain.

Fireblight: use Streptomycin in apples or pears; Mycoshield or Blight Ban for pears

Citrus Brown rot: use Bordeaux mix.

Peach Leaf curl: use Bordeaux mix or Bravo.

Shothole in stone fruit: use Pristine, Bordeaux, or Bravo

Walnut blight: use Bordeaux mix.

Almost all summer applied to walnuts; some winter apps to peach, plum, and nursery crops

Alternatives to Chlorpyrifos

Walnuts

Codling Moth – use mating disruption, Delegate (spinetoram), Altacor (Chlorantraniliprole) , Belt (Flubendiamide), or Proclaim (Emamectin Benzoate)

Frosted scale and European fruit lecanium:use oils

San Jose scale, Walnut scale: use Seize (Pyriproxyfen) or oils

Walnut husk fly: Use Delegate or Spinosad with baits and Imidacloprid

Aphids: Use Provado (Imidacloprid), Assail (Acetamiprid) or oils

Peach

Peachtree borer (not Peach Twig Borer is the only pest for which Lorsban is still recommended. Use Asana (Esfenvalerate) or mating disruption instead.

Plum

European fruit lecanium: use oil without OP

Obliquebanded Leafroller: Delayed dormant treatment with oil plus Dimilin or Spinosad

Peach Twig Borer: Delayed dormant treatment with oil plus Success or Entrust (Spinosad) or Dimilin instead of Lorsban. Spinosad just as effective as Lorsban.

San Jose scale: Delayed dormant treatment with oil plus Esteem (Pyriproxyfen)

Aphids: parasitic wasps: Aphidius spp. releases

Citrus

Citrus red scale and *Citricola scale:* Replace Lorsban with narrow range oil, Applaud, Esteem or Aphytis wasps for CRS

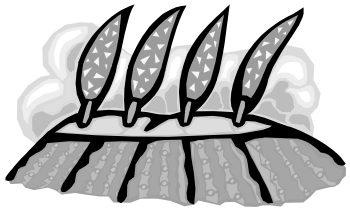
Year-round pest management guidelines, which provide season by season checklists, are now available for alfalfa, almond, apricot, avocado, citrus, cotton, dry beans, grape, nectarine, peach, pear, plum, potato, prune, strawberry, tomato, and walnut. For more information, go to http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html.

NUTRIENT AND SEDIMENT MANAGEMENT

Nutrients can also be major contributors to water quality impairment, especially nitrogen (N) and phosphorus (P). Proper management of fertilizers and amendments such as compost can prevent the problem. Nitrogen is a very mobile nutrient, so do not apply N fertilizers in late fall or winter, wait until spring after most of the rain. Maintain soil organic matter with compost, manures, or cover crops to help retain fertilizers applied and increase their effectiveness. Do not apply manures or compost to fields just before rainfall, and if possible, compost or incorporate manures applied to farm fields. If you are making your own compost, contain the runoff from composting and compost effectively to retain nitrogen. Find composting information at http://cwmi.css.cornell.edu/farmwaste.htm.

Sediment runoff is a fact of life on sloping fields in high rainfall areas such as ours. However, you can greatly reduce sediment loss by using winter cover crops. Using a mix of grasses and legumes as a fall-planted cover crop can contribute nutrients for your crop, improve infiltration of rainfall into your soil, and reduce erosion and sediment runoff. In the foothills, all orchards and vineyards on slopes should be cover cropped and not disked

after establishment. In vegetable crops, as well as tree and vinerows, mulch can help keep water and sediment on your farm. Organic materials such as straw, wood chips, compost, etc. benefit your soil the most, but plastic mulch will also help reduce



sediment loss.

BUFFERS TO CONTAIN STORMWATER RUNOFF

Four main types of buffers can be used on foothill farms to contain stormwater runoff: grass filter strips, grassed waterways, vegetated swales, and hedgerows. ***Grass filter strips*** serve as "biofilters" where grasses and other vegetation filter storm water as it flows across the landscape. Typically, a filter strip is an area along a stream, ditch, or pond which is at least 20 feet wide, and permanently covered by vegetation. Vegetation may include perennial grasses as well as legumes. The strip provides a buffer between farm fields and water sources; and traps sediments, organics, nutrients, pesticides, or other pollutants. The strips reduce runoff velocity, allow it to partially infiltrate, and intercept it before it reaches a water source.

Grassed Waterways can also reduce the movement of contaminants into water sources. Grasses planted along ditches or spillways reduce stormwater velocity, slow and spread water, increasing infiltration, and reduce the sediment load carried by stormwater.

Vegetated Swales are broad, shallow channels planted with a dense stand of vegetation covering the sides and bottom. Swales occur naturally on landscapes, and planting vegetation in them can reduce the velocity of storm water runoff, trap pollutants, and promote infiltration of stormwater.

Hedgerows are permanent plantings that may include trees, shrubs, perennials, annuals, and/or grasses. Generally they are planted on field perimeters or across slopes to prevent soil erosion and retain runoff on farm property. They may also serve other purposes such as habitat for beneficial insects or production of salable products.

Most farms can improve the quality of water moving off-farm by using a variety of management techniques. Consider improving water quality through better irrigation practices, choosing alternative pest management practices, and effective management of fertilizers and amendments. Cultural practices that prevent erosion and establishing buffers between growing ground and water sources can also improve and maintain water quality. Each farm can have an impact on the quality of water in our watershed. Do your part!

ADDITIONAL RESOURCES

Natural Resources Conservation Service www.nrcs.usda.gov

- **The Agricultural Water Enhancement Program** www.nrcs.usda.gov/programs/awep/

California Department of Water Resources http://wwwdwr.water.ca.gov/

- **Water Conservation News** The Department of Water Resources newsletter www.owue.water.ca.gov/news/news.cfm

Placer County Resource Conservation District (RCD) www.placercountyrcd.org

- **Nevada County Resource Conservation District** (RCD) www.ncrcd.org

Northern California Water Association www.norcalwater.org

- **PNSSNS Subwatershed Group** Local subwatershed – part of Sacramento Valley Water Quality Coalition. www.cleanwaters.info

EPA's List of Reduced Risk Pesticides http://www.epa.gov/opprd001/workplan/completionsportrait.pdf

- **Buffer Strips: Common Sense Conservation** A introduction to buffer strips with links to technical information www.nrcs.usda.gov/feature/buffers/

Hedgerows for California Agriculture (CAFF) Benefits to and planning, planting and maintaining hedgerows http://www.caff.org/programs/farmscaping/Hedgerow.pdf