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Alfalfa Year-Round IPM Program (Reviewed 3/17)

ANNUAL CHECKLIST

Supplement to UC IPM Pest Management Guidelines: Alfalfa

Use these guidelines for a monitoring-based IPM program to effectively manage pests, while reducing the risks of pesticides on the environment and human health.

When a pesticide application is considered, review the Pesticide Application Checklist at the bottom of this page for information on how to minimize the risks of pesticide use to water and air quality. Water quality can be impaired when pesticides drift into waterways or when they move off-site. Air quality can be impaired when pesticide applications release volatile organic compounds (VOCs) into the atmosphere.

This year-round IPM program applies to fall-planted alfalfa hay in California. Details on carrying out each practice, information on additional pests, and additional copies of this form are available from the UC IPM Pest Management Guidelines: Alfalfa at http://ipm.ucanr.edu/PMG. Stand establishment is the most critical single factor affecting successful IPM strategies in alfalfa. Follow the practices below to establish and maintain a healthy vigorous stand that resists pest problems.

PLANTING TO STAND ESTABLISHMENT

✓ Done	**Preplant** **Special issues of concern related to water quality:** drift, runoff due to rain.
	Select your field, considering: • Pest history, especially weeds. • Current crops and pest problems. • Surrounding crops and vegetation. • Presence of Sclerotinia stem and crown rot (white mold) on site or in neighboring alfalfa fields. • Soil conditions, particularly salinity and proper drainage for disease management.
	Manage weeds with herbicides or cultivation prior to planting if necessary.
	Consider crop rotation to minimize weeds, diseases, and nematodes.
	Prepare the field for planting by: • Deep tilling to assure deep rooting patterns and drainage • Leveling the land if flood irrigating • Creating a firm but loose seedbed for seed germination Take into account the potential for drainage and run-off problems.
	The beds allow water movement off crowns, helping to prevent seedling diseases
	Select varieties that are tolerant or resistant to known problem pests.
	Select seed considering: • Use of certified seed (weed- and stem nematode-free) • Seed treatment for suspected field pathogens or if planting at suboptimal time. • *Rhizobium* treatment for nitrogen fixation if alfalfa has not recently been grown in the field; it is good to inoculate all fields, as it is cheap insurance. • Select varieties with genetic resistance to major diseases and pests known to occur in the region

✓ Done	**Stand establishment** **Special issues of concern related to water quality:** drift, runoff due to rain, irrigation.
	Ensure proper stand establishment to reduce weed and disease pressure. Plant seed, using proper timing, depth, and seedling rates. • Plant at the proper time for each region: • Central Valley: early fall (September through October)

✓ Done	**Stand establishment** **Special issues of concern related to water quality:** drift, runoff due to rain, irrigation.
	• Imperial Valley: October • Intermountain: spring or August • Plant ¼ to ½ inch deep, depending on soil type. • Assure proper seed-soil contact by using press wheels or rollers. • Provide timely irrigation for seedling germination; do not overirrigate. • Use a higher seed rate for organic production. For more information, see Irrigated Alfalfa Management for Mediterranean and Desert Zones, UC ANR Publication 3512
	Consider interplanting a low density of oats in organic alfalfa or where soil erosion occurs to reduce weed competition and soil erosion, but manage carefully to avoid competition and alfalfa stand loss. • For more information, see *Overseeding and companion cropping in alfalfa*, UC ANR Publication 21594
	Survey weeds when the crop germinates. • Keep records on a weed survey form (PDF). • postemergence herbicide, if needed according to the Pest Management Guidelines.
	Watch for seedling pests. **Invertebrates** • Aphids • Crickets • Cutworms • Flea beetles • Garden symphylans • Grasshoppers • Sowbugs • Thrips • Wireworms **Diseases** • Damping-off diseases such as *Pythium*, *Phytophthora*, and *Rhizoctonia* • Downy mildew • Sclerotinia stem and crown rot (white mold) Keep records on a map of the field (PDF). Manage if needed according to the Pest Management Guidelines.

✓ Done	**Growth to first cutting** **Special issues of concern related to water quality:** drift, runoff due to rain, irrigation.
	Look for signs of weevils, such as chewed leaves. • Manage if needed according to the Pest Management Guidelines.
	Monitor aphids and their natural enemies. • Keep records on an aphid monitoring form (PDF). • Manage if needed according to the Pest Management Guidelines.
	Monitor soil moisture regularly.
	Survey weeds to plan weed management strategy. • Keep records on a weed survey form (PDF). • Apply a postemergence herbicide, if needed according to the Pest Management Guidelines.
	Time first cutting carefully to maintain stand vigor. • Make sure rooting depth is at least 12–18 inches and the crown is formed. • Generally, delayed first cuttings are recommended to assure proper rooting depth. • Check soil moisture status, considering compaction by heavy equipment; high moisture conditions can compact soils.
	dentify other diseases you may see. • Common leaf spot and other leafspot diseases • Downy mildew

✓ Done	**Growth to first cutting** **Special issues of concern related to water quality:** drift, runoff due to rain, irrigation.
	• Sclerotinia stem and crown rot (white mold)

✓ Done	**Pesticide application checklist**
	When planning for possible pesticide applications in an IPM program, consult the Pest Management Guidelines, and review and complete this checklist to consider practices that minimize environmental and efficacy problems.
	✓ **Choose a pesticide from the Pest Management Guidelines for the target pest, considering:**
	• Impact on natural enemies and pollinators. For more information see Protecting Natural Enemies and Pollinators at http://ipm.ucanr.edu/mitigation/protect_beneficials.html.
	• Potential for water quality problems using the UC IPM WaterTox database. See http://ipm.ucanr.edu/TOX/simplewatertox.html.
	• Impact on aquatic invertebrates. For more information, see *Pesticide Choice*, UC ANR Publication 8161 (PDF), http://anrcatalog.ucanr.edu/pdf/8161.pdf.
	• Chemical mode of action, if pesticide resistance is an issue. For more information, see *Herbicide Resistance: Definition and Management Strategies*, UC ANR Publication 8012 (PDF), http://anrcatalog.ucanr.edu/pdf/8012.pdf.
	• Endangered species that may be near your site. Find out using the Department of Pesticide Regulation's PRESCRIBE program. (http://cdpr.ca.gov/docs/endspec/prescint.htm)
	✓ **Before an application**
	Ensure that spray equipment is properly calibrated to deliver the desired pesticide amount for optimal coverage. (See http://ipm.ucanr.edu/training/incorporating-calibration.html)
	Use appropriate spray nozzles and pressure to minimize off-site movement of pesticides.
	Avoid spraying during these conditions to avoid off-site movement of pesticides. • Wind speed under 3 mph or over 10 mph • Temperature inversions • Just prior to rain or irrigation (unless it is an appropriate amount, such as when incorporating a soil-applied pesticide) • At tractor speeds over 2 mph
	Avoid spraying areas of bare soil, such as weevil-damaged areas, with pesticides prone to cause water quality problems. Consider overseeding these areas with grasses.
	Identify and take special care to protect sensitive areas (for example, waterways or riparian areas) surrounding your application site.
	Review and follow labeling for pesticide handling, personal protection equipment (PPE) requirements, storage, and disposal.
	Check and follow restricted entry intervals (REI) and preharvest intervals (PHI).
	✓ **After an application**
	Record application date, product used, rate, and location of application.
	Follow up to confirm that the pesticide application was effective.
	✓ **Consider water management practices that reduce pesticide movement off-site.**
	Consult relevant publications, such as *Protecting Surface Water from Sediment-Associated Pesticides in Furrow-Irrigated Crops*, UC ANR Publication 8403 (PDF), http://anrcatalog.ucanr.edu/pdf/8403.pdf.
	Consult the Department of Pesticide Regulation Groundwater Protection Program (GWPA) website for pesticide information and mitigation measures. (http://cdpr.ca.gov)
	Install an irrigation recirculation or storage and reuse system.

✓ Done	Pesticide application checklist
	Consider alternative water application methods such as sprinklers and drip irrigation which limit off-site water movement
	Limit irrigation to amount required using soil moisture monitoring and evapotranspiration (ET). (See *Irrigated Alfalfa Management for Mediterranean and Desert Zones: Irrigating Alfalfa in Arid Regions*, UC ANR Publication 8293 (PDF), http://anrcatalog.ucanr.edu/pdf/8293.pdf.)
	Consider vegetative filter strips or ditches. (For more information, see *Vegetative Filter Strips,* UC ANR Publication 8195 (PDF), http://anrcatalog.ucanr.edu/pdf/8195.pdf.)
	Apply polyacrylamides in bedded alfalfa and drainage ditches to prevent off-site movement of sediments.
	Redesign inlets and outlets into tailwater ditches to reduce erosion. (For more information, see *Reducing Runoff from Irrigated Lands: Tailwater Return Systems*, http://anrcatalog.ucanr.edu/pdf/8225.pdf)
	✓ Consider practices that reduce air quality problems.
	When possible, reduce volatile organic compound (VOC) emissions by decreasing the amount of pesticide applied, choosing low-emission management methods, and avoiding fumigants and emulsifiable concentrate (EC) formulations.
	Use the Department of Pesticide Regulation calculators to determine VOC emission rates from fumigant and nonfumigant pesticides. (http://cdpr.ca.gov)

More information about topics mentioned on this checklist is available at the UC IPM website: http://ipm.ucanr.edu/PMG/selectnewpest.alfalfa.html.

For more about mitigating the effects of pesticides, see the Mitigation pages: ipm.ucanr.edu/mitigation/.