

GUIDELINES FOR REST BREAKING TREATMENTS IN SWEET CHERRIES

Joe Grant, UC Farm Advisor, San Joaquin County, CA

Steve Southwick, UC Pomology Specialist, UC Davis, CA

Several treatments are available to cherry growers to promote bud break and advance or shorten bloom, with lesser but often significant parallel effects on fruit ripening time. The exact modes of action of these treatments are not well understood, and probably vary slightly among materials. But they all work similarly in concept.

By leaf fall, flower buds for the following season's crop are fully formed. All parts of the flowers in these buds are visible, but they continue to develop and mature slowly through winter. Chilling is needed to promote this and other processes going on in the tree over the winter to prepare the tree for the onset of growth with the return of warm weather in spring. If this development is slowed by less-than-adequate chilling, rest breaking (RB) treatments can be used to partially offset this deficiency. Once a RB treatment is applied, trees are put into a condition in which they will begin to push and grow as soon as the weather warms favorably for growth.

The effectiveness of various available treatments depends mainly on the rate used and treatment timing in relation to the weather and the condition of the tree at the time of application. Within the suggested ranges of treatment timings for each product, early applications tend to advance bloom more than later ones, and later treatments tend to compress bloom more than earlier ones. Since these treatments essentially replace part of trees' chilling requirement, they have a more pronounced impact in low than high chilling years. In fact, the economic benefits of RB treatments should be scrutinized closely in years of adequate chilling, especially when weighed against the risks of these treatments. In very low chill years, applications should be moved later in the treatment window for each material, since treatments may stimulate trees before flowers are fully matured. RB treatments may be ineffective if too little chilling has accumulated prior to the time of application.

There is a risk of phytotoxic effects like killing of buds and/or branches with any of the RB treatments. Historically, injury has been most common at higher RB treatment rates, later application timings, and with certain surfactants. Of course, advancing bloom has inherent risks of its own, since the likelihood of frost and rain is greater early in the spring.

In recent years, researchers, growers, and PCAs have begun accumulating experimental evidence and field experience on the best way to use RB treatments in cherries, as well as the potential benefits and risks of various specific treatments. The materials, rates and timings discussed below are those which have given the most acceptable and consistent results in field trials and grower experience to date. They are provided as suggested guidelines for growers who wish to begin accumulating experience in using RB treatments as a management tool. Growers wishing to use RB treatments should proceed carefully, work closely with their pest control advisor, and treat only small acreages in learning to use these materials.

IMPORTANT: In a September, 2003, enforcement letter to Agricultural Commissioners, the California Department of Pesticide Regulation (DPR) reversed an earlier opinion that considered dormant season applications of nitrogen-based fertilizers to influence bud break to be plant growth regulators that must be registered and regulated as pesticides. US EPA had reviewed the use of these products and concluded that they do not cause a plant to break dormancy but instead promote a uniform bud break. DPR now acknowledges US EPA's position that nitrogen-based fertilizer compounds used post-dormant on trees, shrubs, and vines to ensure uniform bud break are not pesticides. As a result of this action, California agriculture can use these nitrogen-based fertilizer compounds that are registered as fertilizing materials with the California Department of Agriculture (CDFA) during the post dormant season to enhance uniform bud break, provided labeling or advertising does not include express pesticide plant growth regulation claims. CDFA has regulatory authority over fertilizing materials sold in California. In order to be legally sold as a nitrogen-based fertilizer compound the product must be registered with CDFA and the labeling and advertising must not include any specific plant growth regulation claims.

Rest breaking agents

Dormex (hydrogen cyanamide). Research with Dormex has shown that applications at 1-4% (volume/volume) spray solutions can be effective RB treatments for cherries. Four per cent is the most common rate used. Treatments are applied roughly 30 days before normal bud break. Experience to date indicates that Dormex treatments made before trees have received 550-600 hours of chilling at or below 45 °F may be less effective than those applied later. This is thought to occur because trees are triggered out of dormancy before flowers have developed fully. Under favorable conditions, Dormex treatments can advance bloom as much as 10 to 14 days and the first harvest in treated blocks, 7 to 10 days. It has label restrictions related to use, worker safety, and environmental hazards. Dormex should not be applied within 7 days of any oil applications because of potential phytotoxicity.

CAN 17 (calcium ammonium nitrate) + surfactant. Tank mixes of 5 to 45% (v/v) CAN 17 and 0.5 to 4% agricultural surfactant have been shown effective as RB treatments for cherries. A number of available surfactants have been used successfully, including RNA Activator 85, Agri-Dex, Entry, and crop oils. In general, the best results have been achieved when with CAN 17 based treatments are made after 650 to 750 hours of chilling at or below 45 °F have accumulated. There is a risk of phytotoxicity if treatments are applied less than 3 weeks before bud break. In research trials, CAN 17 + surfactant sprays have been somewhat less effective in advancing and compacting bloom and fruit ripening than Dormex. Advancements of 5 to 7 days in bloom and 3 to 5 days in fruit ripening are achievable under favorable conditions.

Erger + surfactant + fertilizer. Less is known about this treatment than the other RB materials. Treatment timing and effectiveness are thought to be similar to CAN 17 + surfactant treatments.

Spray oils. Oils are less effective than other available materials for advancing bloom, but have been used for many years because for compacting the bloom period. A number of types of oil are available and effective, and are generally applied in 4 to 6% spray solutions. Experience to date has shown that effective spray timings are somewhat later than other RB treatments, around 700-800 hours at or below 45°F.

WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in their original labeled containers in a locked cabinet or shed, away from foods or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Recommendations are based on the best information currently available, and treatments based on them should not leave residues exceeding the tolerance established for any particular chemical. Confine chemicals to the area being treated. **THE GROWER IS LEGALLY RESPONSIBLE** for residues on the grower's crops as well as for problems caused by drift from the grower's property to other properties or crops.

Consult your county agricultural commissioner for correct methods of disposing of leftover spray materials and empty containers. **Never burn pesticide containers.**

PHYTOTOXICITY: Certain chemicals may cause plant injury if used at the wrong stage of plant development or when temperatures are too high. Injury may also result from excessive amounts or the wrong formulation or from mixing incompatible materials. Inert ingredients, such as wetters, spreaders, emulsifiers, diluents, and solvents, can cause plant injury. Since formulations are often changed by manufacturers, it is possible that plant injury may occur, even though no injury was noted in previous seasons.