

## Callisto<sup>®</sup> 480 SC Use in Cranberry

Callisto 480 SC (mesotrione) is a broadleaf herbicide which has been granted a User Requested Minor Use Label Expansion (URMULE) for the control or suppression of listed weeds in established cranberry beds. This fact sheet will give background information on the mode of action of this product, review considerations for proper application and outline the expected level of weed control, based on research and grower experience from the Atlantic region.

### Mode of Action

The active ingredient in Callisto, mesotrione, is a Group 27 herbicide. Callisto has both pre-emergent (soil) and post-emergent (leaf) activity. This type of herbicide inhibits an enzyme called p-hydroxyphenyl pyruvate dioxygenase (HPPD) which is used to make pigments in the plant. In susceptible plants, the result of herbicide activity is bleaching symptoms, followed by plant death (Figure 1). Bleaching typically begins in leaf foliage and growing points 3-5 days after application with weed death 2-3 weeks later. The bleaching symptom may be noted on less susceptible plants (like tree species in cranberry production) but may not result in plant death.

### Application Considerations

Callisto is registered for application in established cranberry beds. For bearing beds, the product should be applied after bud break, but before fruit set occurs. In addition, the bed should not be harvested or flooded within 60 days of application. In non-bearing beds, apply after bud break but 60 days prior to fall or winter flooding. Non-bearing beds should not be harvested within 365 days of application or flooded within 60 days of treatment. Three application timings/rates are registered:

**Pre-emergent:** Up to the 2 leaf weed stage, apply 0.30 L Callisto 480 SC/ha in 200 L water/ha. No surfactant is required.

**Post-emergent:** 3 to 8 leaf weed stage, apply 0.21 L Callisto 480 SC/ha in 100-200 L water/ha. A non-ionic surfactant, Agral 90, must be added at 0.2% v/v (2 L Agral 90 per 1000 L spray solution).

**Sequential:** For difficult to control weeds, apply two separate applications of 0.21 L Callisto 480 SC/ha in 100-200 L water/ha. A non-ionic surfactant, Agral 90, must be added at 0.2% v/v (2 L Agral 90 per 1000 L spray solution). A minimum of 14 days is required between applications.



Figure 1. Bleaching of vetch caused by Callisto.

Application must be made by ground application equipment only and should not be sprayed to runoff. Callisto should not be applied by air, by hand or through any type of irrigation equipment. Apply with a spray pressure of 206 – 300 kPa and a flat fan nozzle. Callisto should not be applied directly to water or to areas where surface water is present. If rain or sprinkler irrigation for frost protection is expected within 48 hours, application should be delayed. Avoid application when heavy rains are forecast. When using sprayers without shrouds or cones, a buffer zone of 1 metre is required to protect aquatic habitat, while 10 metres is required for the protection of terrestrial habitat. Do not enter or allow worker entry into treated areas during the Restricted Entry Interval (REI) of 12 hours.

Temporary crop injury may occur if applications are made under extreme weather conditions or when the crop is under water or temperature stress (Figure 2). If possible, applications during crop bloom or periods of plant stress should be avoided. Cranberry injury is most visible where excessive rates have been applied, such as sprayer overlaps. Organophosphate or carbamate insecticide application may increase crop sensitivity to Callisto, where a 7 day application separation between these products may reduce the chance of injury. No tank-mixes with Callisto are currently registered for use in cranberry. There is an increased potential for crop injury when extra surfactant is added. The use of high surfactant rates or non-labelled surfactants has caused leaf burning to the crop. Callisto applications made soon after bed establishment could delay crop development, especially when irrigation follows herbicide application. Wait at least 18 months after the last Callisto application in cranberries before replanting cranberries or rotating to another crop.

For best results, apply Callisto to actively growing weeds. In general, less mature weeds are easier to control than mature weeds. Weeds that emerge after Callisto application may be controlled after they absorb the herbicide from the soil provided there is sufficient moisture for uptake. When applied to weeds post emergent, thorough coverage of emerged weeds is essential for effective control. Although weed competition is quickly halted, visual symptoms of dying weeds (discolouration) may take up to 2 weeks to appear, depending on the weed species and growing conditions. Under unfavourable conditions, such as drought, heat, flooding, prolonged cool temperatures or insufficient fertility, adequate control may not be achieved and weed re-growth may occur (Figure 3). The ideal timing generally corresponds with applications soon after bud break in cranberry, in early June. For sequential applications, two applications made before crop flowering have shown improved weed control and crop tolerance in limited field experience.



**Figure 2.** Temporary cranberry injury caused by Callisto.



**Figure 3.** Goldenrod re-growth following Callisto application.

## ***Effect of Callisto 480 SC on Cranberry Weed Species***

The information below was compiled from the Callisto 480 SC label, grower experience and research trials performed by researchers at the University of Maine, Dalhousie Agricultural Campus and New Brunswick Department of Agriculture, Aquaculture and Fisheries. This list shows the potential control spectrum of this herbicide and does not guarantee performance. Factors such as weather, field history, stage of growth, herbicide rate and differences in weed populations or biotypes can influence herbicide activity. Many species, like vetch, will require additional herbicide applications in future seasons for full control. Sequential Callisto applications are expected to improve weed control for many of the suppressed and inconsistently controlled weed species.

### **Labelled Weeds**

**Control:** Lamb's-quarters (pre-emergence), redroot pigweed, velvetleaf, wild mustard (pre-emergence), eastern black nightshade (post-emergence).

**Suppression:** Common ragweed, vetch, creeping buttercup

**Sequential Control:** Goldenrod

**Sequential Suppression:** Rushes (*Juncus*), sedges (*Carex*) and cinquefoils (*Potentilla*)

### **Research and Grower Experience – Single Application**

**Susceptible** (80%+ weed control): Burnweed

**Suppressed** (60-80% weed control): Beggarticks, fireweed, violet species

**Variable** (inconsistent weed control): Asters, birch, brambles (*Rubus*), ground nut, hardhack/meadowsweet, maple, poplar, rice cutgrass, smooth crabgrass, St. John's wort, white clover, willow, yellow hop clover, yellow loosestrife

**Tolerant** (limited to no weed control): Hawkweed, lily/orchid, quackgrass, sheep sorrel, ticklegrass