

Lowbush Blueberry Fact Sheet

Using and Applying VELPAR and PRONONE in Lowbush Blueberry Fields

Since VELPAR'S™ (hexazine) registration in 1982, blueberry growers have become increasingly dependent upon VELPAR™ to provide them with the high level of weed control that they require. VELPAR™ has helped reduce weeds as one of the major limiting constraints in the production of wild lowbush blueberries, and has helped revolutionize and create a viable blueberry industry.

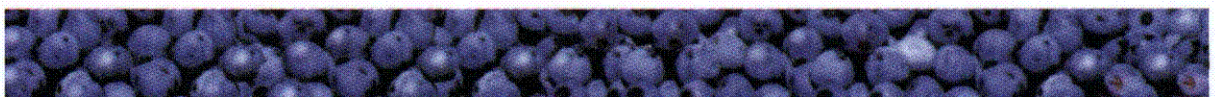
In 1990, a granular formulation of the same chemical found in VELPAR™ (hexazinone) was also registered and sold under the name PRONONE™. PRONONE™ is essentially the same product as VELPAR™ but is a granular formulation that requires no mixing with water, as does liquid VELPAR™. The majority of blueberry growers currently use and depend upon these two herbicides to provide them with weed control over most of their acreage.

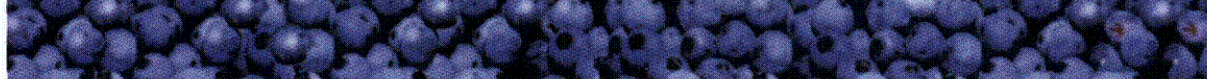
Since blueberry growers tend to depend upon hexazinone, either in the liquid VELPAR™ or granular PRONONE™ formulation for controlling their weeds, questions are often posed on how these herbicides work. This factsheet has been prepared to provide blueberry growers with information that will help explain various factors that can affect the performance of both VELPAR™ and PRONONE™.

Factors Influencing the Performance of VELPAR™ and PRONONE™

1. **Moisture.** VELPAR™ and PRONONE™ require 0.6 to 1.3 cm of rainfall within two weeks of application. This is necessary to move it to the weed seed and root zone where it is active. If the desired rainfall amounts do not occur within this time frame, reduced weed control can be expected.
2. **Temperature.** Warm temperatures enable weeds to grow more actively. As a result weeds can pick up and translocate VELPAR™ and PRONONE™ more quickly and effectively. Weed control will still result at lower temperatures but will be much slower.

Applications should not be applied to frozen ground as it will be more difficult for the herbicide to be washed into the soil where it is required. It is also possible that a lot of the herbicide could wash away before it has an opportunity to move into the soil.





- 3. Soil texture.** As soils become heavier from sand to clay, more VELPAR™ and PRONONE™ is required to obtain the same degree of control. Soils heavy in clay tightly bind a lot of VELPAR™ and PRONONE™ making it less available for weeds to pick up. The higher VELPAR™ and PRONONE™ rates should be used on these soils to adjust for this bound and unavailable VELPAR™ and PRONONE™.

VELPAR™ and PRONONE™ use is not recommended on sandy/gravelly soils because of rapid leaching. If it must be used, best results are obtained when applied as close to blueberry emergence as possible. This will help ensure that the herbicide has had less of a chance to leach away when the weeds start to actively grow.

PRONONE™ use may be more effective than VELPAR™ on these sandy/gravelly soils as it can be applied later than VELPAR™. Unlike VELPAR™ significant injury will not result if PRONONE™ is applied to emerged blueberry leaves, as no foliar uptake results from granules which fall to the ground. In addition, it is thought that PRONONE™ is released through the granules slower than liquid VELPAR™ in water. As a result there would be less of a chance for the PRONONE™ to leach away as quickly, making it more available for the weeds to pick up and be controlled.

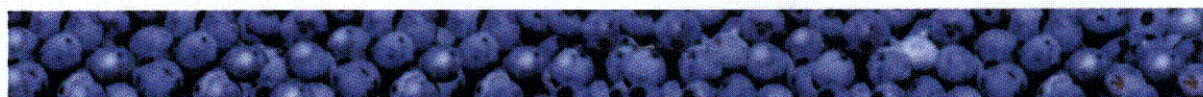
- 4. Organic matter.** Fields high in organic matter (greater than 6.0%) absorb more VELPAR™ and PRONONE™ making it less available. As a result reduced weed control can be expected. Higher rates should therefore be used to adjust for this absorption. Differences in organic matter can explain varying results from neighbouring fields.

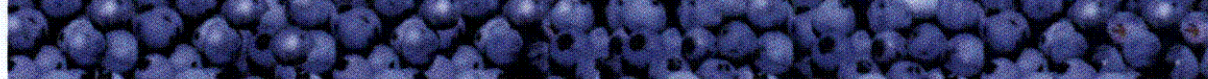
The past history of the field may also influence organic matter levels. Fields developed from forest can have higher organic matter levels near the soil surface as compared to fields developed from abandoned hay fields which may have the organic matter more evenly distributed in the soil.

- 5. PH.** VELPAR™ and PRONONE™ works most effectively on low pH soils.
- 6. Weed tolerance and herbicide rates.** Not all weeds are susceptible to VELPAR™ and PRONONE™ and will therefore not be controlled at any of the recommended rates. In addition the susceptible weeds vary in their sensitivity to VELPAR™ and PRONONE™ and their level of control can be rate dependant. In general on a medium type soil (i.e. loam), annual herbaceous weeds are the easiest to control and therefore require only the lowest recommended rates. Most of the grasses associated with blueberry fields can be controlled at acceptable levels at the low to mid VELPAR™ or PRONONE™ rates. Many of the woody weeds are more difficult to control and generally require the upper range of recommended rates.

It is important to remember however, that the soil type and organic matter levels can dictate herbicide rates as much as the weed species.

In an effort to reduce their herbicide load from an integrated weed management stand point, some growers have been experimenting with below labelled rates. Results have been somewhat variable depending upon weed pressure, soil type and application timing. In fields with a low weed pressure, medium type soils (not too sandy or too much clay) and when applied as close to blueberry emergence as possible, results have tended to be the most consistent and promising. Growers will have to experiment on a small scale first to determine whether reduced rates will provide the desired level of weed control.



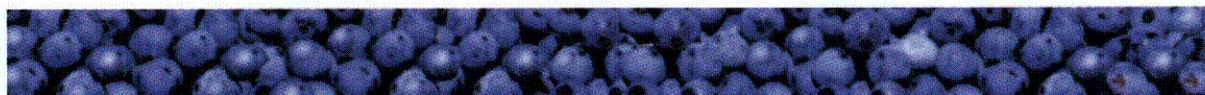


7. **Soil drainage.** VELPAR™ and PRONONE™ applied in poorly drained soils can cause increased blueberry injury and poor weed control by not being permitted to move to the weed root and seed zone. Instead VELPAR™ and PRONONE™ stays in the water and can injure blueberries as they advance.
8. **Field slope.** VELPAR™ and PRONONE™ are considered mobile and can follow slopes within a field. As a result it can accumulate in low areas and cause blueberry injury. In addition reduced weed control can be expected in the higher areas since a lot of the applied VELPAR™ and PRONONE™ will have moved.
9. **Blueberry clone sensitivity.** Various blueberry clones are sensitive to VELPAR™ and PRONONE™ and can be injured. It is estimated that 3-10% of blueberry clones are sensitive. Blueberry clonal injury should become less evident after a few years of VELPAR™ and PRONONE™ use as sensitive clones will be killed out and be replaced with tolerant ones.
10. **Pruning.** There does not appear to be any relationship between pruning method and VELPAR™ and PRONONE™ effectiveness.
11. **Length of control.** A number of factors influence the length of time that VELPAR™ and PRONONE™ remains active in the soil. VELPAR™ and PRONONE™ is broken down over time by micro-organisms in the soil. The residual period is influenced by organic matter, soil temperature, plant uptake, leaching, reaction with other chemicals and soil absorption. These things can vary from field to field and can result in weed control differences. The length of control can therefore vary depending upon the above factors.
12. **Application timing.** VELPAR™ and PRONONE™ are both pre emergent herbicides registered for use in the sprout year. These herbicides must therefore be applied before the blueberry plants emerge and leaf out. If using liquid VELPAR™ it can be advantageous to apply it as close as possible to blueberry emergence. This is particularly true, as discussed above, on sandy/gravelly soil and on fields where reduced rates are being used.

Applications of PRONONE™ applied after the blueberries emerge and leaf out are also being evaluated. This is not possible with liquid VELPAR™ as the spray would contact the emerged leaves and cause injury. The granular PRONONE™ however drops to the soil surface thereby avoiding any foliar uptake through the leaves. This can be advantageous on sandy/gravelly soil where pre emergent applications may leach away before the weeds start to actively grow. In addition, fields in which a pre emergent application of PRONONE™ or VELPAR™ could not be applied before blueberry plants and leaves start to emerge due to wet conditions could be treated with PRONONE™ at a later time without concern.

13. **Proper Application.** This is a factor that is controllable and under the direct influence of the applicator. The sprayer for VELPAR™ application and a fertilizer spreader for PRONONE™ application must be properly calibrated to ensure that not too much or too little VELPAR™ or PRONONE™ is being applied. In addition, uniform distribution with no overlap is critical (foam markers are recommended where possible).

Even and uniform application is more difficult on rough fields. Tractors should therefore travel very slow to avoid excess movement of application equipment. Selection of the proper nozzle size to deliver the proper amount of water for the speed that you must travel at in the field is critical for VELPAR™ application. The fertilizer spreader opening setting is also very important to ensure proper application rate for PRONONE™.





PRONONE - Advantages

1. Ready to use granular - no mixing or water is required. Applicator exposure is therefore less of a concern. Water source or movement of water is not a problem.
2. Drift less of a concern as heavy granules are used. Could therefore be applied in heavier winds than liquid VELPAR™.
3. Can be applied in less than ideal condition.
4. More flexibility in application timing (can be applied early postemergence)
5. Can provide better control of some weeds, than VELPAR™ and PRONONE™ applied pre emergence.
6. Container disposal not an issue.
7. Can be applied with fertilizer spreaders, which are cheaper than sprayers.

Disadvantages

1. Even coverage difficult as rough terrain will influence distribution.
2. Proper overlap difficult.
3. Bags more difficult and bulky to handle than containers.

Pronone Application Equipment

- Vicon 3 point hitch fertilizer spreader (or similar type) is known to provide consistent results (approx, \$2000.00).
- These spreaders have 3 release holes at the bottom of the hopper. The two closest holes to the tractor should be plugged off using a seed kit available from Vicon dealers. A cover surrounding the agitator shaft should also be put on.
- Setting on the Vicon spreader should be between 24 and 26 for best results.
- Swath width is 10.4 m; 100% overlap is necessary (10-11 granules per square foot = 20 kg/ha)
- Proper calibration is very important - blanks are available to calibrate with.
- For spot applications of PRONONE™ motorized backpack applicators are available for purchase.
- For very precise application of PRONONE™ air assisted pneumatic spreaders are available but are much more expensive than the Vicon spreaders.

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