Best Management Practices for Hexazinone

The registration of hexazinone (Velpar® DF/Pronone® 10G) has been cited as the reason for advancement in wild blueberry production. This herbicide revolutionized the industry by providing high levels of weed control which significantly increased both yields and quality. In addition, it provided the opportunity to apply many other tools of modern day blueberry production. The use of hexazinone has become an essential component of wild blueberry production.

Although the value and importance of hexazinone within the wild blueberry industry is well recognized, concerns have been expressed. Hexazinone is known to be highly soluble in water with a low tendency to adsorb to soil. In addition, it is considered moderately persistent in blueberry soil. The combination of these factors implies that if hexazinone is used improperly, it could move with the flow of water through the soil (leach) into the groundwater. The potential for groundwater contamination is a reality that must be addressed in a proactive manner by blueberry growers.

Groundwater is an essential natural resource. It forms when water moves between the Earth's surface, filling in empty spaces in and around rocks and porous materials. Groundwater is a source of fresh water that supplies wells and springs. Surface water may move several feet in a short period of time (seconds) whereas groundwater may move only a few feet in a month or a year. While the combination of conditions which allow pesticides to reach groundwater may rarely occur, it is the responsibility of blueberry growers to ensure that hexazinone is applied and used in a manner to help prevent ground and/or surface water contamination. It is important that blueberry growers aggressively continue and expand their efforts to balance the requirement for good weed control, with the requirement to preserve water quality. By acting in a proactive manner, groundwater contamination problems will be less likely. This fact sheet was prepared to assist blueberry growers in making sound environmental stewardship decisions that will help preserve our water resources.

The following is a list of factors which contribute to ground and/or surface water contamination. Best Management Practice recommendations are also included, to provide guidance in choosing the methods which are most likely to reduce the probability or potential for ground and surface water contamination. A number of recommendations are provided from which growers can evaluate their own practices and select and implement the most appropriate Best Management Practices for their particular field and production situation.

Factor #1: Blueberry fields developed on sandy, sandy loam, or gravel type soils are more prone to hexazinone leaching to groundwater.

Recommendations:

- Match the hexazinone rate with your soil type. Knowledge of your soil type and organic matter levels is important in identifying the susceptibility of fields to groundwater contamination. For example, use the lowest recommended rates on light soils (i.e. sandy, sandy loam). Avoid application to extremely sandy or gravelly soils. If organic matter levels

are high, leaching may be reduced. Contact your nearest Department of Agriculture, Aquaculture and Fisheries office for information on getting your soil type and organic matter levels determined.

- Fine textured, heavy (clay) soils are conducive to surface water contamination as they drain slowly and promote runoff. On these heavier soils avoid applications if heavy rainfalls are forecast.

Factor #2: Surface and/or groundwater supplies are easily contaminated from spills or misuse of hexazinone.

Recommendations:

- Do not apply Velpar® DF within 1 metre (3 ft) of freshwater habitat (lakes, streams, ponds, sink holes, etc.) or within 5 metres (16 ft) of terrestrial habitat (grasslands, forested areas, shelterbelts, woodlots, etc.). Do not apply Pronone® 10G by ground within 50 metres of water bodies.
- Do not apply hexazinone within 50 meters (164 ft) of wells. Blueberry fields developed around or in close proximity to old homesteads often have hand dug wells and these wells should also be avoided.
- Do not mix or load hexazinone near water. Bring the water to the sprayer and not the sprayer to the water. Using refillable water tanks in the field, or mixing and loading over a liquid-tight pad is preferable.
- Do not overfill sprayers.
- Do not spray ditches where running water may flow, or near ditches where water is flowing.
- Do not apply hexazinone over rock formations (including exposed ledges), that appear at the surface of the ground as they may provide a direct channel to groundwater.
- Store pesticides in a safe place and at least 30 meters (99 ft) from wells or other surface water sources. The floor of the storage facility should be impermeable to water and have a lip to contain spills. Refer to Fact Sheet C1.4.0 for more information on pesticide storage.

Factor #3: Back siphoning from the spray tank to the water source must be avoided when filling up the sprayer, as direct water contamination can result.

Recommendation:

- To prevent back siphoning from spray equipment into the water source, an anti-backflow (back siphoning prevention) device must be used. As an added precaution, keep the end of the fill hose above the water level in the spray tank when filling.

Factor #4: Improper disposal of unused chemical, empty containers and equipment rinse-water can lead to localized ground and surface water contamination.

Recommendations:

- Always follow label directions, mixing only the quantities you require. Know the size of the area you want to treat.
- Do not dump unused Velpar or Pronone. Following a liquid application, any remaining tank mix can be diluted with water and applied over the blueberry field.
- Never dump the pure chemical remaining in the container. Mix it at the correct rates and spray, or dilute it down and spray over the blueberry field following label recommendations.

- Unrinsed empty containers often contain small amounts of herbicides. Ensure the pesticide container is empty, then triple or pressure-rinse the empty container thoroughly and place the rinse back into the sprayer. Make the empty container unsuitable for further use by puncturing the side and dispose of the container in accordance with provincial requirements. (See your chemical dealer or contact your local Department of Environment (1-800-561-4036) for more information).

Factor #5: Poorly constructed, improperly protected and badly placed wells can easily be contaminated with hexazinone.

Recommendations:

- Inspect older wells for the condition of the upper 2 to 3 meters (7 to 10 ft) of casing. Replace the casing and cap with concrete if their condition is questionable. Keep in mind that pesticides may drift into open wells.
- Build a slope of impervious clay material running away from the well for 7 meters (23 ft) if the well is particularly susceptible to runoff waters.

Factor #6: Calibration of herbicide application equipment is extremely important. Applying too much chemical can cause crop injury, waste money and can increase the probability of groundwater contamination.

Recommendations:

- Calibrate your sprayer or spreader first thing in the spring and recheck it often, particularly if applying over a large acreage. Refer to fact sheets C1.2.0 and C4.4.0 from this series on Sprayer Calibration For Liquid Applications; and Vicon Spreader: Set-up and Calibration for the Application of Pronone® 10G, respectively.
- Ensure that the Velpar spray and the Pronone granule pattern and distribution are uniform.
- Replace worn or defective nozzles on the sprayer.
- Use foam markers or GPS systems to help ensure that herbicide overlap does not occur.

Factor #7: Weather before, during, and after hexazinone application can influence the probability of both ground and surface water contamination.

Recommendations:

- Do not apply hexazinone if heavy rains are forecast, as surface runoff or leaching may result.
- Do not apply hexazinone onto frozen or water-saturated soils as the potential for runoff is greater.
- Apply hexazinone as close to blueberry emergence as possible. Weeds are more actively growing and therefore more likely to absorb the herbicide. In addition, the probability of applying to water saturated soils is generally less.

Factor #8: Lack of vegetation strips near sensitive water sources increases the probability of hexazinone surface runoff.

Recommendation:

- Leave an untreated vegetation strip near any water sources. Vegetation strips act as filters around these sensitive areas and can reduce the amount of chemical run off into water courses. Wider vegetation strips are more effective.

Factor #9: Spraying steep slopes and bare areas can promote hexazinone runoff.

Recommendations:

- Steep slopes are erosion prone and are more likely to lose herbicides that are attached to soil particles. This can cause excessive build-up at the bottom of slopes and increase the potential for localized groundwater contamination. This is also true on rough blueberry fields with many low depressions. Vegetation buffer strips at the bottom of steep slopes can act as a filter or buffer area.
- If possible, avoid spraying bare areas where there is no vegetation to absorb the herbicide. When spraying such areas, groundwater contamination is more likely, particularly if on a sandy or sandy loam soil low in organic matter. Allowing some vegetation to grow in sensitive areas will reduce soil erosion and can encourage blueberry growth into bare areas.
- Avoid heavy burns, if possible, as it destroys the organic matter. Organic matter helps absorb chemicals, and promotes blueberry growth.

Factor #10: The distance to the groundwater and the composition of the layers between the soil surface and the groundwater will influence the potential of hexazinone reaching the groundwater.

Recommendation:

- If the distance to the groundwater is within a few feet of the soil surface, herbicide contamination from hexazinone is more likely. If the geological layers between the soil and the groundwater permits rapid movement of the surface water to the groundwater (i.e. sand and gravel; no bedrock), use the lowest recommended rate or if possible avoid application until the water table lowers (water tables are generally high in early spring). Know your soil type and field characteristics.

Factor #11: Drift during Velpar applications can cause surface water contamination.

Recommendations:

- Do not apply in periods of dead calm. Avoid applications when the wind is gusty. A general rule of thumb is not to spray pesticides if wind speeds exceed 16 km/hr. Spray in early morning or evening when wind speeds are generally at their lowest.
- Drift can be reduced by using nozzles which produce large droplets and by using 110^{o} nozzles. The 110^{o} nozzle permits you to keep the boom slightly lower than the 80^{o} nozzle.
- Do not apply with spray droplets smaller than the American Society of Agricultural and Biological Engineers (ASABE) coarse classification.
- Boom height must be 60 cm (2 ft) or less above the crop or ground.
- The planting of windbreaks is recommended in large wild blueberry fields to reduce winds, thereby making growing and pollination conditions more favourable. These windbreaks can also help make spraying conditions more favourable, and can act as a physical barrier to prevent spray drift from reaching any vulnerable surface water resource located near by.

Factor #12: Spraying entire blueberry fields with hexazinone when it is not required, increases the probability of ground and surface water contamination.

Recommendations:

- Scout for weed problems in both the fruiting and sprout years to identify the presence and location of weeds. Only certain areas of fields may require spraying.
- Determine the weed pressure and susceptibility of weeds present. Use the lowest rate which will provide acceptable control.
- Examine other weed control options and select control options with the greatest chance of success.

Factor #13: Continuous use of hexazinone leads to an increased probability of ground and/or surface water contamination. Other weed management strategies should be considered to reduce the dependence on hexazinone.

Recommendations:

- The use of spot sprays and wiping is useful to control weeds escaping hexazinone applications. Other effective herbicides should be used in conjunction with hexazinone.
- The use of mulches in bare areas can help prevent weed establishment and encourage blueberry plants to spread.
- Interplanting blueberry plants in bare areas can help prevent weeds from establishing in these areas.
- Cutting and hand pulling a number of different weeds will help decrease weed competition.

Additional Recommendations

- Inform your neighbours so they are aware of your activities and are not speculating that precautions are not being taken.
- Comply with all federal and provincial regulations when applying pesticides. A pesticide applicator cannot apply a pesticide to any area within the Province unless they hold a valid Pesticide Applicators License, available from the Department of Environment.
- Take the General Pesticide Application Course to increase your knowledge and to increase the confidence of the general public in your ability to properly apply and handle pesticides. Successful completion of their course is required to purchase or apply pesticides in New Brunswick (contact Department of Environment 1-800-561-4036).
- Read and follow label directions precisely as indicated. The label has been carefully developed after many years of testing. If you do not follow the label instructions your treatment may not be effective and you increase the chances of water contamination. Furthermore, you are violating the law if label instructions are not being followed. Label statements can be adjusted between growing seasons, so it is necessary to review the label before every pesticide application.
- Keep records on product use for each field.
- Encourage all growers to implement the Best Management Practices.