18. Local Application of Herbicides Using a GPS

INTRODUCTION

The local application of herbicides is a method of integrated pesticide management. By using less herbicide, local application is more economical and better for the environment, while also reducing the amount of time spent spraying. Equally important, local application lowers the risk of phytotoxicity in the blueberry plants, not to mention that of weeds developing resistance.

Local application means focusing herbicide use on areas where an infestation genuinely threatens to reduce crop yield, and where the weeds targeted are vulnerable to the herbicide chosen. Since mowing will have made the weeds less visible, GPS technology can come in very handy.

BENEFITS OF THE METHOD

Agrinova conducted a study comparing the local application of hexazinone (VELPAR® or PRONONE®) to application over the entire field. The results showed a reduction of 51 to 81% in the amount used, representing a savings of $98 to $164 per hectare. These results agree with studies conducted on other crops.

METHODOLOGY FOR LOCAL APPLICATION WITH GPS

Preliminary data collection

To begin, the producer must have a map presenting an overall view of the field and its contours. Contour data is acquired in the field, while aerial photographs from La Financière agricole du Québec can also be used. Next, the producer and his agronomist must identify any sensitive zones where herbicides cannot be applied (watercourses, riparian strips, sand dunes, wells and so on), redefining the field contours if necessary. This is done by walking the field with a pocket GPS, and/or by using aerial photographs.

Identifying weeds

Specific patches with actionable levels of weed infestation must then be located on the map. This is done when scouting for weeds, either on foot or using a vehicle such as an ATV. To save time it can also be done while mowing (Figure 1), though it takes considerable attention on the part of the operator to combine such operations effectively. A better way is to use the software program employed for spreading herbicide, reducing the risk of error. Keep in mind that training is required to identify weeds correctly.

It is crucial to ensure that the data you collect can be readily processed afterwards. For example, be sure to select the same system of geodesic coordinates (e.g. WGS 84) if using different programs for weed location and herbicide application. This is where the help of a technical advisor can be particularly beneficial. An example of a weed map is presented in Figure 2.

Transmission of data to the technical advisor

Data can be transferred over the Internet or on the memory card used for data collection. If the technical advisor is also the equipment supplier, he can transfer the data directly from the GPS installed on the tractor.

Figure 1. GPS on a tractor
Source: Bruno Bouchard, Lagüe Précision

Preparation of herbicide application maps

For this step, consider asking for help from a technical advisor. Using data obtained by the producer and agronomist in the first three steps, a technical advisor will prepare maps for planning the work of herbicide application (Figure 3). He will ensure that the data format is compatible with the system to be used.

In view of the technical limitations of certain systems, it is crucial to account for potential errors caused by phase differentials in the equipment (speed of progress, GPS position, delay between opening the valve and the flow of product at the right dose). Patches smaller than 9 m^2 can be hard to treat with any precision, and should therefore be ignored or treated over a larger area. Planning for a wider application area will compensate for inaccuracies due to technical limitations.

Local application of herbicides

Using the spreading maps prepared beforehand, apply herbicide only where is an identified need.

Before you start, the spreader or sprayer should be calibrated. The system's precision should also be verified, since otherwise GPS drift could make the whole operation ineffective. For best results, run a complete test with the help of a specialist in precision agricultural equipment.

During application, follow the map carefully and pay attention to how the system is performing. For example, satellite reception may degrade when you are near a windbreak, or the system may stop for some reason.

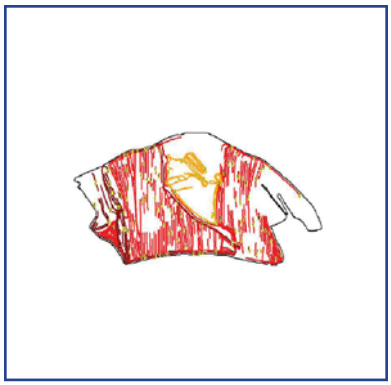

Figure 2. Weed map produced during mowing
Source: Bruno Bouchard, Lagüe Précision

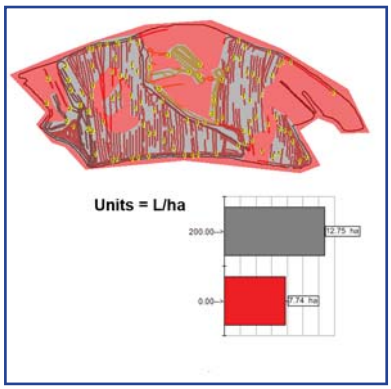

Figure 3. Application map (areas to treat, and doses)
Source: Bruno Bouchard, Lagüe Précision

EQUIPMENT REQUIRED

Local application of herbicides is facilitated by the following:

- aerial photographs (e.g. from La Financière agricole du Québec);
- pocket GPS (georeferenced data acquisition system);
- tractor equipped with a GPS and a computer;
- computer and data processing software (technical advisor);
- fixed- or variable-rate application controller (this is optional, but it improves the effectiveness and precision of herbicide application while reducing operator error).

COMPLEMENTARY LEAFLET

20. Sprayer Calibration

REFERENCES

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