Mechanical weeding of Corn

By
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in collaboration with the members of the Centre de développement d'agrobiologie

This brochure explains how to reduce the use of herbicides in grain-corn and in silage corn by using mechanical weeding.

Mechanical weeding effectively replaces herbicides in 40 to 50% of fields, while maintaining yield and avoiding re-infestation by weed seeds. Some farms even succeed in reducing herbicide use for corn by 100%. Mechanical weeding costs only $40 to $50/ha. This represents savings of $10 to $30/ha per farm on average compared to conventional use of herbicides.

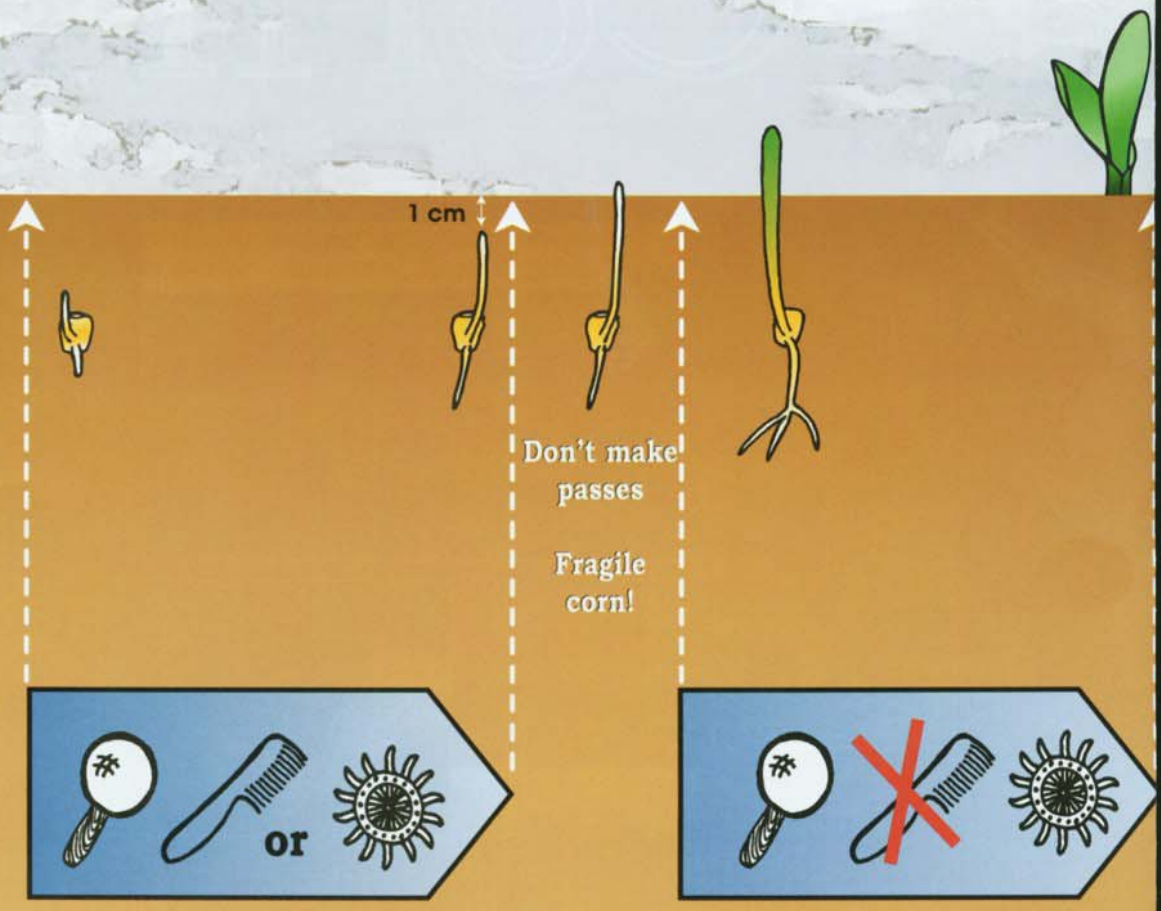
We propose a 5-step approach, based on the development stage of the corn, from seeding to 10 leaves. At each of these stages we describe what should be scouted in the field in order to make an informed decision about weeding. We also indicate in what time period that decision must be executed the field.

This brochure was developed after several years of research in cooperation with several Quebec farms using mechanical weeding. We now urge you to follow in their steps and to take action!

Mechanical weeding of Corn

WHEN SOWING, MAKE SURE...

- of having controlled perennial weeds as well as possible (working the soil, rotation, fallow, green manure, herbicides, etc.).
- to increase the seeding rate from 5 to 10% (to compensate for the anticipated loss of some plants).
- to seed uniformly at least 4 cm deep (1½ inches).



1 PRE-EMERGENCE STAGE

- Scout the stage of the corn by scraping the soil as early as 3 days after seeding when the weather is warm and humid.
- Make a pass with the flex-tine harrow or the rotary hoe if the corn has sprouted but is deeper than 1cm (3/8 inch) from the surface of the soil. This is the best stage to make a pass. **The flex-tine harrow is the most efficient tool at this stage.**

Note: Make the pass as soon as the prime stage is reached, whether the soil has a crust or not. It is best to make the pass in dry weather, but do not delay making the pass in the hope of getting these conditions.

2 1 TO 2-LEAF STAGE

- Scout the stage and the state of the corn.
- Make a pass with the rotary hoe when the majority of corn plants are spiked above the soil surface and are developing normally (no nutritional deficiencies nor lack of water). **Do not use the flex-tine harrow at this stage.**

Note : There is about a 2 day period in which to make this pass, otherwise the weeds may develop too much.

Saint-Laurent Vision 2000

Stratégie phytosanitaire

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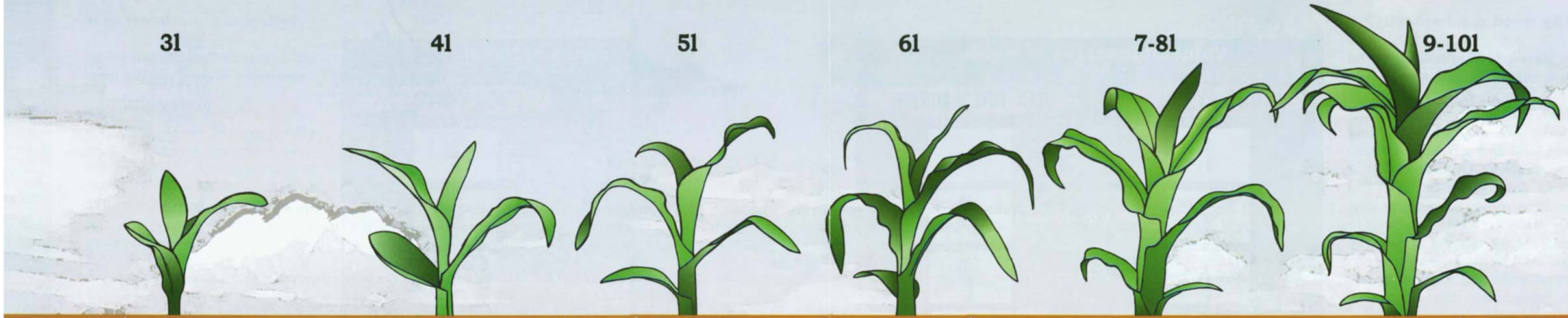
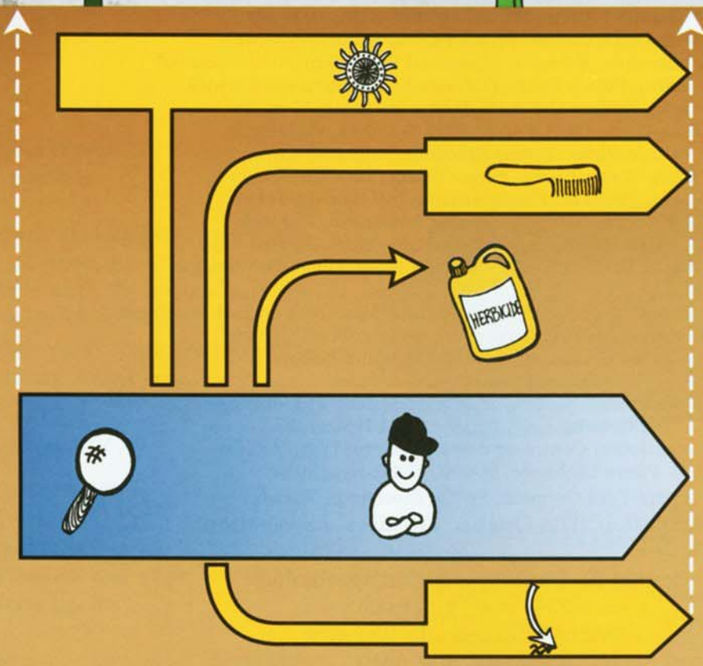
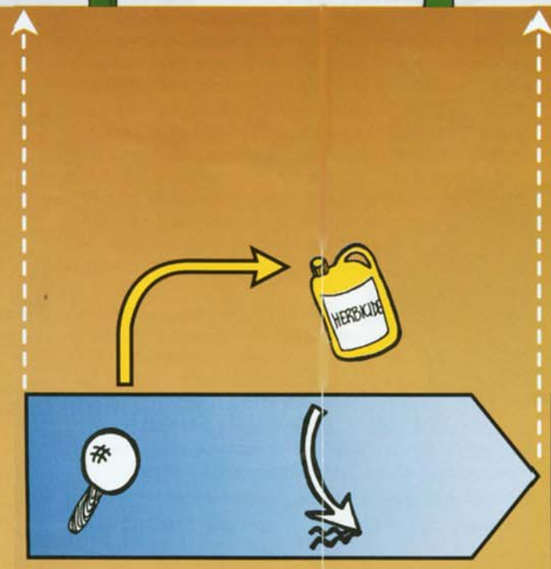




3 3 TO 4-LEAF STAGE

- Scout the annual weeds in the rows as well as the state of the corn.
- Choose one of the following actions:
  1) Don't do anything if the pressure from weeds is **low***.
  2) Make a pass with the flex-tine harrow or the rotary hoe if the pressure from weeds is **moderate*** and if the corn is developing normally. Use the rotary hoe at the 3 to 4-leaf stage, or the flex-tine harrow at the 4-leaf stage. If using the flex-tine harrow, make sure it doesn't bury or uproot the corn plants. Act within 2 days if using the rotary hoe and within 3 days if using the flex-tine harrow, regardless of whether the soil has a crust or not.
  3) Consider using an herbicide treatment only if the pressure from weeds is **high***.

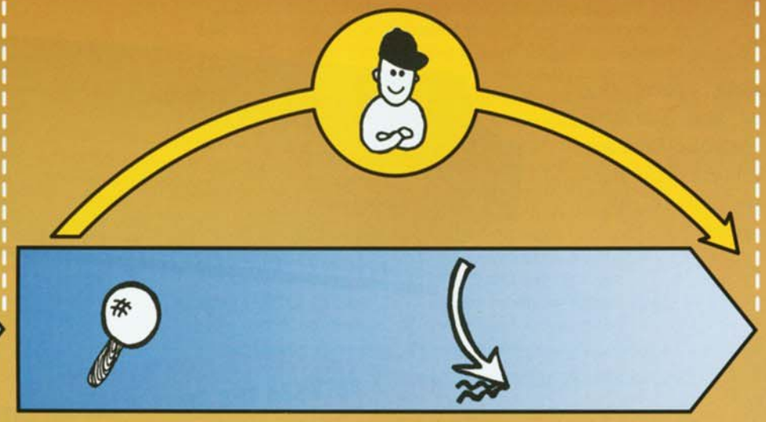
Note: Some producers prefer to make an early pass with the row cultivator at the 4-leaf stage of corn to counter quack grass infestations. This technique is effective mainly in light soils.



4 5 TO 6-LEAF STAGE

- Scout the annual weeds in the rows and the quackgrass between the rows of corn.
- Choose one of the following actions:
  1) Make a pass with the row cultivator if the pressure from weeds is **low***. Act within a week if using the row cultivator.
  2) Consider using an herbicide treatment only if pressure from weeds is **high***.

Note: Nitrogen applicators do not do a good enough job between the rows. If using this device, make sure the weeds between rows are thoroughly destroyed.



5 7 TO 10-LEAF STAGE

- Scout the annual weeds between the rows of corn.
- Make a pass with the row cultivator if there are still too many annual weeds between the rows, otherwise don't do anything. Make a pass with the row cultivator when the weeds are less than 10 cm (4 inches) high.

Note: Make a pass with the row cultivator within a week.

*** Evaluation of pressure from weeds**

A certain number of weeds can be tolerated without losing yield or increasing the weed seed bank. With experience one can evaluate whether the weeds in the field present low, moderate or high pressure. In order to acquire this experience the use of a ***decision-making tool*** *that precisely evaluates weed conditions in the field and the corresponding weeding actions to undertake is recommended.*

End of weeding

Take the time to evaluate the production season and to think of possible improvements for next year.

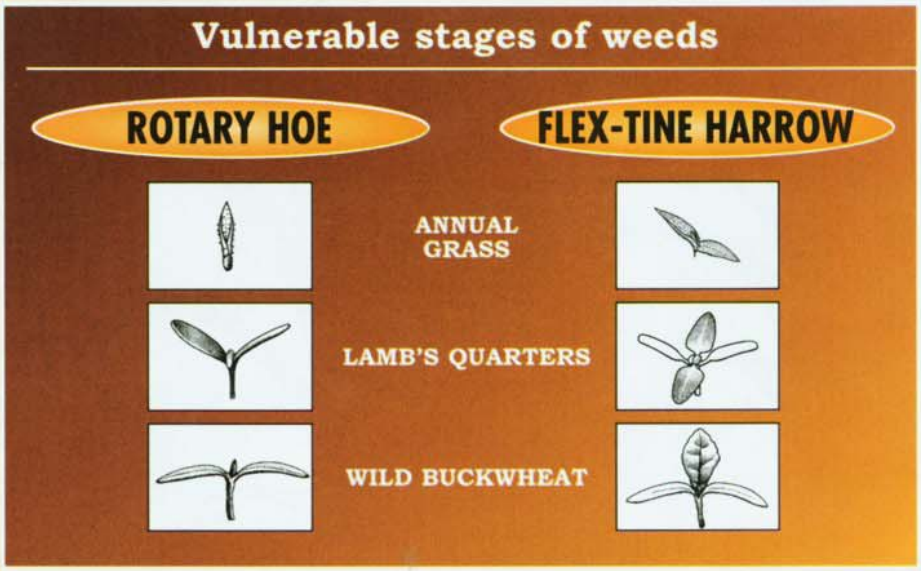
Legend

- Visit to scout the field
- Make a pass with the flex-tine harrow
- Make a pass with the rotary hoe
- Make a pass with the row cultivator
- Don't do anything
- Apply an herbicide treatment
- Most often used interventions
- Options for special cases

Why weed mechanically?

To increase the efficiency of the farm and for greater autonomy

Would you apply herbicide on your corn if you were sure of getting good yield and a clean field without spraying? Of course not, it would be a waste of time. The weed control strategy presented in this brochure will help you to make better decisions, field by field. And to increase your confidence and your independence, we recommend that you use a decision-making tool in the field.



Claude J. Bouchard and Romain Néron. Direction des services technologiques, MAPAQ.

To benefit from new markets

Mechanical weeding opens the door to specialized and lucrative markets such as organic farming and pesticide-free corn. The premiums vary from 20 to 40% depending on the year.

DON'T WAIT FOR IDEAL CONDITIONS!

The rotary hoe is more effective in soils with a light surface crust, when there is no rain in the hours following the pass. However, it is better to make the pass right away than to wait for ideal conditions which may not occur.

To protect the environment, your health and your family's health

A large portion of all pesticides sold are sprayed on corn. Most of these pesticides are herbicides: atrazine, metolachloride, bentazone and dicamba to name the most important ones. Herbicides may be hazardous to human health and to the environment. Aquatic life is also seriously threatened by some herbicides such as atrazine, which often exceeds the criteria for water quality.

BETWEEN THE ROWS IS IMPORTANT!

The rotary hoe and the flex-tine harrow are not sufficient to successfully grow corn without herbicides, even if all equipment passes are made at the right time. An effective mechanical weeding strategy must also include one or two passes with the cultivator. Neglecting to use the cultivator will seriously increase the risk of loss of yield. For the sake of profit, make a pass between the rows.

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