WEEDPRO75 – An Online Herbicide Selector Tool For Field Corn

Purpose:

1) Development a “grower-friendly” computer based decision support program for selection of profit maximizing weed control strategies in corn

2) Incorporate public Ontario research (i.e. problem weed control trials) that would improve this decision support program and allow for selection of reduced environmental risk herbicides.

An Ontario field study (Hamill et al, 2004) demonstrated that weed control costs can be reduced by $45/ha when a profit maximization approach to weed management was used. A profit maximization strategy for weed control considers herbicide costs, efficacy, crop staging, environmental conditions, weed emergence relative to the crop and most importantly competitiveness of the weed species present in the field.
Since there are a number of complex variables that must be considered before selecting a weed control program that maximizes profit, computer based decision support programs are required to consider all variables and synthesize them down to a strategy that can be adopted.

Methods:

Focus groups were conducted to identify an online interface (website) that was both easy to use and was of value to them for their weed management decision making. A proven and existing database that was constructed by Ag Canada in the 1990’s was used to populate this new online program. A public trials database was developed so that any new publicly funded weed management research is incorporated into the decision making tool. In 2007, strips trials were conducted at various locations to test the ability of the decision making tool. Areas of weakness were then identified and incorporated into the program

Results:

Strip trials proved to be invaluable for testing WEEDPRO75. The following observations have been incorporated into WEEDPRO75:

- In general, treatment suggestions generated in WEEDPRO75 provided similar corn yields to that of the weed-free check (Table 1). It was expected that the weed-free treatment would out yield all other treatments simply because the corn crop was subjected to no weed competition, an unlikely event in most field corn scenarios.

- Average yields of eight strip trials found that selecting a herbicide program based on weed density, herbicide price, expected grain yield and price (the “most

profitable" treatment) provided grain yields similar to that of the treatment that would provide the highest efficacy (Table 1).

- In two of the strip trials, weed species densities were so high that the most profitable treatment and most efficacious treatment were one in the same (Table 2), since any failure in weed control would result in significant yield losses.

- In three of the strip trials, weed species (not thought to have historically existed in each field) had emerged after field scouting and were poorly controlled by the selected herbicide treatment. This observation prompted the program developers to ensure that these types of "weed surprises" can be easily documented within the field profiles so as to be incorporated into any future weed management decision related to that specific field.

- In one of the field trials, the weed spectrum consisted of small populations of grassy and broadleaf weeds. A product was selected, which happened to have very little soil residual activity. A second flush of weeds came up after application, control was poor and grain yield was reduced. Based on this observation, information on the residual activity of each herbicide treatment is now provided in WEEDPRO75. Therefore, if one was to look for a herbicide program at the 2-leaf stage of corn, a grower can see what treatments provide residual activity.

Table 1: Average grain yields (t/ha) amongst eight strip trials evaluating the "Most Profitable" and "Most Efficacious" weed control treatments as suggested by WEEDPRO75 and compared to an untreated check.

Treatment Type	Average Yield* (t/ha)
Most Profitable (selected by WEEDPRO75)	12.24
Most Efficacious (selected by WEEDPRO75)	11.50
Weed-free check	12.57

**Summary of 8 strip trials conducted in Western, Southern and Eastern Ontario in 2007.*

Table 2: Average grain yields (t/ha) amongst two strip trials whereby weed pressure was so high (above 50 plants/m^2) that the "Most Profitable" treatment was also the "Most Efficacious" treatment.

Treatment Type	Average Yield* (t/ha)
Most Profitable & Efficacious (selected by WEEDPRO75)	9.88
Weed-free check	10.42

* Summary of two strip trails conducted in Western Ontario in 2007

Summary:

Expected Benefits to Ontario Corn Producers:

- Growers have the opportunity to select herbicide programs based on their priorities (i.e. efficacy, price, impact on the environment, etc.)

- This program incorporates all publicly funded research data, in particular the "problem weed" research conducted by the University of Guelph's Department of Plant Agriculture allowing for more informed and judicious selection of herbicide programs.

- Growers are better able to keep records of weed species and herbicide treatments used in each field, a powerful tool for improving weed management choices in future years.

- WEEDPRO75 minimizes the risk of applying an inappropriate product that may then require additional herbicide applications. Therefore, WEEDPRO75 has the potential to reduce pesticide use.

Next Steps:

Feedback from clients will be collected and areas for improvement will be identified and incorporated into the program if funding can be obtained to do so.

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Location of Project Final Report:

WEEDPRO75 can be used by going to www.weedpro75.com, starting in March of 2008.