WEED CONTROL IN SUGAR BEET IN EUROPE

JAN D.A. WEVERS

IRS (Institute of Sugar Beet Research), P.O. Box 32, NL-4600 AA Bergen op Zoom, the Netherlands

Chairman of the IIRB study group on Weed Control

ABSTRACT

Many active ingredients are available for the control of dicotyledonous weeds in Europe, but there are differences in availability between countries. In the future a common EU-list with active ingredients will be the basis for products to be registered in the member countries. Weeds are controlled during three main periods: pre-planting, pre-emergence and post-emergence. Except for specific weed problems, the pre-plant applications are seldom used anymore, because of the availability of very effective post-emergence herbicides. Some examples will be presented. To a much lesser extent this also applies to the pre-emergence treatments as main emphasis is on post-emergence treatments. The general tendency is to control weeds several times during the growing season with tank mixes. The ingredients in the tank mixes are chosen according to the weed flora present and the dosage is set according to the stage of the weeds, and only in some cases of stage of the beet. To reduce costs, efforts are made to find the minimal dose needed for a given situation of weed flora, weed stage and weather conditions. Several examples will be presented. In some countries efforts are made to reduce the environmental impact of herbicides by special actions. In those cases mechanical hoeing is an integral part of weed control. In general, however, weed control is carried out by overall herbicide applications.

For monocotyledonous weeds several products are also available. In most cases they are applied separately, but in some situations low dosages of a graminicide are added to tank mixes for the control of dicots and monocots simultaneously. A list of available products will be presented.

ABRÉGÉ - LE DÉSHERBAGE DE LA BETTERAVES SUCRIÈRES EN EUROPE

En Europe, de nombreuses substances actives sont disponible pour la lutte contre les adventices dicotylées, avec toutefois des différences entre les pays. A l'avenir une liste européenne commune des substances actives servira de base pour l'agréation des produits dans les pays membres. Le désherbage se déroule à trois périodes distinctes: présemis, préémergence et postémergence. A l'exception de quelques cas d'adventices particulières, le traitement de présemis n'est quasiment plus appliqué, au profit des traitements de postémergence. Quelques exemples sont présentés. Le nombre de traitements de préémergence à également diminué, mais dans une moindre mesure que ceux de présemis. La plupart des traitements sont réalisés en postémergence.

Ceux-ci consistent généralement en une succession de traitements à base de mélanges de produits. Les produits sont choisis en fonction de la flore adventice présente et la dose fixée selon le stade des adventices et dans quelques cas seulement le stade des betteraves. En vue de réduire les coûts, des efforts sont réalisés pour définir la dose minimale requise pour une situation donnée de flore adventice, de stade et de conditions climatiques. De nombreux exemples seront présentés. Dans quelques pays, des mesures spécifiques sont prises pour réduire l'impact environnemental des herbicides. Dans ces cas le désherbage mécaniques constitue une part intégrale du désherbage. Dans l'ensemble cependant, le désherbage est réalisé au moyen d'applications d'herbicides en généralisé.

Pour la lutte contre les graminées plusieurs produits sont également disponibles. Dans la plupart des cas, ils sont appliqués séparément, mais des doses réduites de graminicides sont également rajoutées aux mélanges anti-dicotylédones. Une liste des produits disponibles sera présentée.

KURFASSUNG - UNKRAUTBEKÄMPFUNG IN ZUCKERRÜBENFORSCHUNG IN EUROPA

Für die Unkrautbekämpfung in Europa stehen viele Wirkstoffe, allerdings mit einigen Unterschieden zwischen den Ländern, zur Verfügung. In Zukunft wird eine gemeinsame EU-Liste mit Wirkstoffen die Basis für die Registrierung von Produkten in den Mitgliedsländern bilden. Im allgemeinen werden die Unkräuter zu drei Zeitpunkten bekämpft: Vor der Saat, im Vorauflauf und im Nachauflauf. Mit Ausnahme der Bekämpfung von Sonderunkräutern werden kaum noch Herbizide vor der Saat angewendet, da sehr effektive Produkte im Nachauflauf verfügbar sind. Einige Beispiele werden präsentiert. Auch die Zahl der Anwendungen im Vorauflauf werden aus gleichem Grund immer geringer. Das größte Interesse hat jetzt die Anwendung im Nachauflauf. Allgemein werden Unkräuter in mehreren Anwendungen mit unterschiedlichen Tankmischungen bekämpft. Die Komponenten einer Tankmischung werden in Abhängigkeit der Unkrautarten und die Aufwandmenge in Abhängigkeit der Unkrautgröße gewählt. Das Entwicklungsstadium der Zuckerrüben spielt eine untergeordnete Rolle. Aus Gründen der Kostenreduzierung wird versucht die minimale Aufwandmenge zu bestimmen, um eine gegebene Unkrautflora in Abhängigkeit des Unkrautstadiums und der Wetterbedingungen zu kontrollieren. Hierfür werden einige Beispiele gezeigt. In einigen Ländern wird auch versucht durch Sondermaßnahmen, die durch Herbizide verursachten Umweltbelastungen, zu minimieren. In diesen Fällen ist die mechanische Unkrautbekämpfung ein integraler Teil des Gesamtkonzeptes. Im allgemeinen werden die Unkräuter aber durch ganzflächige Anwendung von Herbiziden bekämpft.

Für die Bekämpfung von Unkrautgräsern stehen ebenfalls mehrere Produkte zur Verfügung. Meist werden diese Produkte in einem separaten Arbeitsgang eingesetzt. Es werden aber auch reduzierte Aufwandmengen zur Ungrasbekämpfung in Tankmischungen mit anderen Herbiziden beigefügt. Eine Liste mit zur Verfügung stehenden Produkten wird präsentiert.

1.- INTRODUCTION

In the near future an uniform European system of registration of crop protection products will be realised. But yet there will be differences in product availability between countries. However these differences will be rather small. A list of the most common active ingredients used in Europe is presented in table 1.

Table 1. Available active ingredients in Europe.

for dicot control	***for monocot control***
pre-sowing	
	triallate
pre-emergence	
quinmerac	(s-)metolachlor
pre- and post-emergence	
chloridazon	
lenacil	
metamitron	
post-emergence	
clopyralid	fluazifop
desmedipham	clethodim
dimethanamid-p	cycloxydim
ethofumesate	haloxyfop
phenmedipham	propaquizafop
propyzamide	quizalofop
s-metolachlor	sethoxydim
triflusulfuron	tepraloxydim

Recommendations on weed control are very much similar in different countries due to open exchange of information within IIRB study group on:

- efficacy
- selectivity
- effects of tank mixes
- specific weed problems.

2.- SPECIFIC LEGISLATION

Due to specific legislation in some countries there are restrictions in weed control e.g.

- Switzerland: no pre-emergence treatments allowed;
- Sweden: preferably band spraying and hoeing;
- some other countries: reduction of total amount of pesticides [Wevers, 2001].

3.- WEED CONTROL PRE-SOWING AND PRE-EMERGENCE

Only in cases specific weed problems require this, pre-sowing and pre-emergence applications are applied. Dry weather conditions and high organic matter content will reduce efficacy of residual herbicides and may also restrict these applications. Specific weed problems which might effect in pre-emergence treatments are:

Aethusa cynapium	chloridazon + quinmerac (1600 + 200 g a.i./ha);
Matricaria matricarioides	chloridazon or metamitron (160 or 175 g a.i./ha);
Mercurialis annua	chloridazon (160 g a.i./ha);
Polygonum aviculare	lenacil (50 g a.i./ha) is added to chloridazon or metamitron.

4.- POST-EMERGENCE TREATMENTS

Examples of tank mixes used in post-emergence are shown in table 2. From table 2 it can be seen that the dose of standard 1 can vary rather strongly between countries. This variation, however less strong, can also exist within a country. This is mainly caused by the choice of the beet grower between a greater number of applications at lowest possible dosages or a restricted number at high dosages.

Dosages from table 2 will be increased if:

- a treatment is delayed and weeds have a greater stage than first true leaf;
- savings are needed on operation costs e.g. in the case a field is far from the farm.

5.- BAND SPRAYING AND MECHANICAL WEED CONTROL

In some countries, with legislation on the reduction of total amount of herbicides, e.g. Sweden, mechanical weed control is an integral part of weed control. In other countries the importance of mechanical weed control is very variable. In some cases it is applied as a finishing touch just before canopy closing to

remove escaping weeds and perennials. If it is an integral part of the total weed control system, herbicides are applied on bands on the row. If that is done, bands of about 15 to 17cm, i.e. one third of the row distance of 45 or 50cm. Normally the hectare dosage applied on the band is about half of the doses listed in table 2. The reduction in the dose is less than the reduction in treated area, which is caused by the loss of herbicides form the treated band to the inter-row area. The relative unimportance of mechnical weed control is mainly caused by the unbalance between the savings on herbicides and the extra costs for hoeing and band spraying in comparison to overall spraying. For overall spraying standard equipment covers a width between 18 and 42m, while band spraying and hoeing is done on 12 to 18 rows (5.4 to 9.0m).

6.- TRANSFER OF INFORMATION

The recommendations on weed control are sent to the growers in journals of sugar industry or growers organisations. More and more interactive systems are becoming available. Some internet sites which can be used are listed in table 3.

Table 3. Internet sites with information on weed control.

** under development; apart from the internet site a CD-rom 'FAR-consult' is available with recommendations*

country	site	look for
Belgium	www.irbab.be	FAR-consult *
France	www.institut-betterave.asso.fr	Betsy
Germany	www.liz-online.de	LIZ Herbizid
	www.bisz.suedzucker.de	Herbselect and Herbinfo
Netherlands	www.irs.nl	Betakwik, Onkruidbestrijding
Spain	www.aimcra.com	Recomendaciones, Herbicidas
United Kingdom	www.bsonline.co.uk	Growers Guide, Weed Control

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LITERATURE

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Table 2. Some examples of tank mixes, advised to control general and some specific weed problems in Europe

[1] *n.r. = not relevant*

weed flora	tank mix	stage beet [1]	dosage	country
standard 1	ethofumesate + phenmedipham + metamitron	n.r.	50+80+280 to 200+200+600	B, CH, D, DK, ES, F, I, NL, S
standard 2	ethofumesate + phenmedipham + chloridazon	n.r.	100+80+325	B, ES. NL
standard 3	desmedipham + ethof. + phenm. + metamitron	n.r.	25+65+150+700	B, D, F, NL
Aethusa cynapium	ethofumesate + phenmedipham + triflusulfuron	n.r.	100+80+30	B, CH, F, NI
Amaranthus retroflexus	standard 3	n.r.	see above	B, CH, F, I, NI
Bidens tripartita	standard 1, 2 or 3 + clopyralid or	n.r.	see above +33 or	I, NI
	standard 1, 2 or 3 + triflusulfuron	n.r.	see above +15	
Cirsium spp.	spot treatment with clopyralid plus additive	4 leaf	100 to 150 + additive	most countries
Cuscuta spp.	standard 3 + propyzamide	2 leaf	see above +350	I
Galium aparine	ethofumesate + phenmedipham + triflusulfuron	n.r.	100+80+15	B, CH, F, NI
Mercurialis annua	standard 2 + lenacil or	2 leaf	see above +50 or	B, F, NI
	standard 2 + triflusulfuron	n.r.	see above +8	