WEED PROBLEMS IN SWEDISH SPRING-SOWN OIL CROPS

By Birger Granström
Department of Plant Husbandry
Swedish University of Agricultural Sciences
Uppsala, Sweden

THE WEED FLORA

The weed flora in Swedish spring-sown crops has been intensively studied for the last three decades (Granström, 1962; Gummesson, 1975). These studies show that the weed flora has changed depending on ecological effects of new cropping technique, methods of harvesting, changed crop sequences and farming systems, and direct control of weeds.

The following species have decreased: Chenopodium album, Galeopsis spp, Polygonum lapathifolium, Polygonum persicaria, Stellaria media, Spergula arvensis, Thlaspi arvense, and Sinapis arvensis. The species mentioned here are, however, still very frequent. The following species show small changes: Polygonum convolvulus, and Tripleurospermum maritimum. Increase is observed for Viola arvensis, Lamium spp, Fumaria officinalis, Galium aparine, Myosotis spp, and Veronica spp. It is clearly documented that the number of plants of the weed stand as a whole in spring-sown crops has decreased during the last thirty years.

A comparison in 1977 between dicotyledonous weed plants in spring-sown Brassica crops and cereals one month after emergence of the crops illustrates strikingly, as shown below here, the weak competitive ability of Brassica crops as follows. Thus the plant weights in grams of the weed species in spring-sown Brassica crops were for Chenopodium album 1.73, for Galeopsis spp 0.94, for Stellaria media 1.05 and for all species as a mean 1.39. Corresponding figures in spring sown cereals were 0.65, 0.37, 0.57 and 0.76 grams respectively.

THE CROPPING TECHNIQUE AND THE WEEDS

Row spacing and seed rate of Brassica crops are important with respect to weeds. An increase of row spacings from 12 to 24 cm will increase the number of dicotyledonous weed plants by 10 per cent in spring rape and 10-15 per cent in spring turnip rape. Increased seed rate from 5 to 20 kg per hectare will reduce the number of weed plants by 40 per cent in rape and 35 per cent in turnip rape with row spacings of 12 cm (Ohlsson, 1976).

In a series of field trials in 1969 the yields at the row spacings 10.0 - 12.5, 20 - 25 and 40 - 50 cm were studied. The relative figures for the yields were for rape seed 100, 106 and 110, and for turnip rape seed 100, 114 and 117 respectively. The narrowest row spacing reduced the weeds (Tripleurospermum maritimum, Viola spp and Chenopodium album) with 5 per cent in weight compared with a hoed crop with row spacings of 40 - 50 cm.

SELECTIVITY OF HERBICIDES AND THEIR USE

Trichloroacetic acid (TCA) has been used as a soil-applied herbicide in cruciferous crops since 1952 against Agropyron repens (Granström, 1960). Nitrofen was introduced as a selective herbicide in Brassica crops on the dicotyledone stage in 1965. Nitrofen controls effectively Chenopodium album, Galeopsis spp, and has a good effect against Polygonum spp. Trifluralin controls Ch. album, Galeopsis spp, Stellaria media, and Polygonum

spp. Both rape seed and turnip rape seed are resistant against nitrofen and trifluralin (Aamisepp and Granström, 1964). The selectivity of desmetryne, diklobenil, simazine, and flampropisopropyl is too low for them to be used in spring-sown Brassica crops. Alachlor and propachlor have too low controlling effect against the weeds in spring-sown crops.

FIELD EXPERIMENTS WITH WEED CONTROL

Avena fatua is a noxious weed in spring-sown crops. Triallate is used as a soil-applied herbicide, but as the effect depends on soil moisture dry weather will cause problems. Table 1 presents results from 1977, when triallate was compared with the foliage-applied herbicides barban and benzoylpropethyl.

TABLE 1

CONTROL OF AVENA FATUA IN RAPE SEED

Treatment	Yield		Avena fatua, rel. numbers	
	kg/ha	rel.yield	plant number	weight
Control	1.570	100	100	100
Triallate 2.0 kg/ha	1.590	102	16	15
Barban 1.0 kg/ha	1.590	102	24	18
Benzoylpropethyl 1.0 kg/ha	1.510	96	4	3
Number of trials	4	4	4	4

Benzoylpropethyl is now recommended against Avena fatua in Brassica crops.

Soil-applied herbicides and foliage-applied herbicides have also been studied for control of dicotyledonous weeds in a great number of field trials. Table 2 illustrates results of 17 trials in the year 1966. The figures for the weeds report the weight of the weed stand in relative numbers.

TABLE 2

CONTROL OF DICOTYLEDONOUS WEEDS IN BRASSICA CROPS

Treatment	seed yield, rel.weight		Ch.	Pol.	Stell.	Gal.	All
	rapeseed	turnip rapeseed	album	conv.	media	spp	spec.
Control	100	100	100	100	100	100	100
Nitrofen 1.25 kg/ha	119	108	37	23	77	1	50
Trifluralin 1.11 kg/ha	109	104	23	27	19	40	36
Penoxalin 1.65 kg/ha	111	99	11	23	24	39	23
Dinitramin 0.75 kg/ha	112	102	21	42	11	24	31
Dimetachlor 1.50 kg/ha	112	104	44	51	29	21	42
Number of trials	7	10	13	5	5	2	16

The fields were treated with nitrofen after the cotyledone stage of the crop, with trifluralin, penoxalin, and dinitramin before sowing, and with dimetachlor immediately after sowing. Nitrofen now dominates the weed

control in Swedish spring-sown oil crops. The results of the trials show, however, that alternative herbicides are promising.

INTEGRATED WEED CONTROL

TCA in Brassica crops has been very valuable in long-period control programs with respect to Agropyron repens. Control of annual dicotyledonous weeds in cereals is very important for the following spring-sown oil crops. Reduction of these weeds in the fields is essential for a successful production of spring sown rapeseed and turnip rapeseed. Control of weeds in the crops must include as well proper cropping technique as soil cultivation and use of herbicides.

REFERENCES

Aamisepp, A. and B. Granström, 1964. Nya kemiska medel i kampen mot ogräs. Aktuellt från Lantbrukshögskolan, no. 20, 20 pp.

Granström, B., 1960. Control of couch-grass (Agropyron repens PB) with TCA. Statens Jordbruksförsök, Medd. no. 105, 20 pp.

Granström, B., 1962. Studies on weeds in spring-sown crops. Ibid. no. 130, 188 pp.

Gummesson, G., 1975. Weeds in cereals. 16th Swedish Weed Conference, pp. K 2-19.

Ohlsson, I., 1976. Effects of row spacing on yield and quality of spring rape and spring turnip rape. Lantbrukshögskolans Medd., no. 253, 52 pp.