The control of *Alternaria*, *Sclerotinia* and *Botrytis* on oilseed rape with spray treatments of a flowable formulation of iprodione

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SUMMARY

A 25% a.i. flowable formulation of iprodione ('Rovral Flo'/'Kidan'/'Verisan') with enhanced weathering characteristics has been evaluated extensively throughout Europe against the major stem and pod diseases of oilseed rape, using ground and aerial applicators.

A single treatment of 2 l. formulation/ha applied to the developing pods has been shown to protect them from severe attacks of *Alternaria brassicae* until harvest, producing yield increases of up to 30%.

Treatments applied over the flowering period will also protect the plants from *Botrytis cinerea* attack and extend the photosynthetic life of both leaves and pods.

When applied at a dose rate of 3 l. formulation/ha, over the flowering period, in accordance with local disease forecasting recommendations, the product has proved to be very effective against *Sclerotinia sclerotiorum*, subsequently improving yields by up to 20%.

INTRODUCTION

The area devoted to the growing of oilseed rape in countries belonging to the EEC, has increased considerably during the last 10 years. The greatest proportional increase has occurred in the U.K. where in 1982 some 220,000 ha were sown, equalling the area in W.Germany and being approximately half of that grown in France. It is inevitable that such a dramatic increase should carry with it husbandry problems, of which the most significant has been the importance of diseases.

Surveys of U.K. rape crops carried out by the Agricultural Development & Advisory Service (A.D.A.S.) during recent years have shown *Alternaria brassicae* to be the most important pathogen (Evans & Gladders, 1981, Evans *et al* 1983).

In France, epidemiological studies on A.brassicae on rape were carried out by Louvet & Billotte (1964) and regular yield losses caused by the disease noted by Messeliere (1981).

The activity of iprodione on A.brassicae was first demonstrated in the UK at the National Vegetable Research Station (Maude 1976). Further work at this centre also showed activity of this fungicide when used as a seed treatment on Leptosphaeria maculans (Humpherson-Jones et al, 1980). This technique has now become standard in the U.K. for Brassica oleracea seed production crops and latterly in oilseed rape (B.napus). The significance of seed-borne contamination of A.brassicae and L.maculans in rape crops in the U.K. is discussed by Humpherson-Jones & Maude (1983).

Seed treatment alone, will not give sufficient persistence for the control of later infections of Alternaria, caused by wind-borne spores, which can lead to pod shatter. Humpherson-Jones & Maude (1982) used a programme of 3 sprays of iprodione in B.oleracea crops. They achieved good disease control, increase in seed yield and improved germination.

In the U.K. in 1981, a single spray of iprodione at 500g a.i./ha was applied at the end of flowering to rape crops, using land and aerial applicators. Although early Alternaria infection caused seed pods to become attacked by the time of spraying, persistent control was obtained which was reflected in little disease being found within treated seed (Cox et al 1981). This work also confirmed the superiority of an oil-based flowable formulation of iprodione first noted by Humpherson-Jones et al (1981). A.D.A.S. trials conducted in that year showed that this treatment increased yield by up to 22% (Evans & Gladders, 1981).

Similar work carried out by the Centre Technique Interprofessional des Oléagineux Métropolitains (C.E.T.I.O.M.) in France between 1978-1980 gave best control when iprodione was applied at early pod formation (Messeliere 1981).

Sclerotinia is an important disease in areas with favourable climatic conditions and a long history of rape growing, particularly Scandinavia, Germany and to a lesser extent France, where severe attacks can cause losses up to 1 tonne/ha (Leval 1979). Such losses can be attributed to a reduction in 1000 grain weight and to premature senescence causing pod shatter (Kruger 1980). In the United Kingdom very few damaging attacks have occurred, (Evans et al 1983). Iprodione sprays have given effective control of the disease when applied over the first petal fall period (Glemas 1981) somewhat earlier than is optimal for Alternaria control. In this case a dose rate of 750g a.i. iprodione/ha has been found to be most cost-effective.

METHODS

Trials on the control of *Alternaria*, *Botrytis* and *Sclerotinia* in 1982 were of a small plot, replicated nature. Iprodione was formulated as a 25% a.i. suspension concentrate ('Rovral Flo'/'Kidan'/'Verisan'). Dose rate for *Alternaria* and *Botrytis* trials was 500g a.i./ha iprodione (= 2.0 l. iprodione flo/ha) and 750g a.i./ha (3.0 l. iprodione flo/ha) for the *Sclerotinia* trials.

Treatment timing was G3 = 20 pods formed with grains visible in lower pods (Lechapt, G. 1980) for *Alternaria*/*Botrytis*. Timing for *Sclerotinia* is given in each table.

Assessments for *Alternaria* were made according to the disease index devised by C.E.T.I.O.M.

RESULTS

Table 1 Control of *A.brassicae* in winter oilseed rape. Chartres, France 1982

cv. Jet Neuf; treated 19.5 Spray volume 500 l/ha
Disease first seen on pods 10.6; Harvested 17.7

	Fungicide	Dose g. a.i./ha	Disease Index * (30.6)	Harvest Yield t/ha	Harvest Yield % of Untreated
(a) Trial 1	Untreated	-	22.6	-	-
	Phtalimide Fungicide	1200	19.7	-	-
	Iprodione flo	500	1.3	-	-
(b) Trial 2	Untreated	-	49.0	2.61	100
	Phtalimide Fungicide	1200	48.0	2.65	102
	Iprodione flo	500	8.0	2.80	107
	" "	750	1.9	2.76	106

* 0 - Clean pods. 100 - Over 75% of pod area infected on over 75% of pods.

Table 2 The effect of iprodione at two spray timings on the control of *B.cinerea* in winter oilseed rape - UK 1982.

Mean of 5 trials; cv. Jet Neuf;
Timing - a = G3 = 20 pods formed. b = G4 = 95% petal fall

Fungicide	Dose rate g a.i./ha	Timing	Mean number stem lesions >25% circumference per 20 racemes
Untreated	-	-	35
Iprodione flo	500	a	8
" "	500	b	17
" "	500	a + b	3

Table 3 The effect of iprodione spray on S.sclerotiorum on oilseed rape

State Plant Protection Centre, Lyngby, Denmark, 1982

Single spray at 100% flowering

Crop	Fungicide	Dose rate g a.i./ha	% Plants Infected	Relative Yield
Winter rape (mean of 2 trials)	Untreated	-	21.3	100 (3.6 t/ha)
	Iprodione flo	750	7.0	108
	'Other dicarboximide'	750	5.0	100
Spring rape	Untreated	-	12.2	100 (2.3 t/ha)
	Iprodione flo	750	1.8	102
	'Other dicarboximide'	750	1.0	107

Table 4 Effect of iprodione spray on S.sclerotiorum in rape

W.Germany 1982

(a) Official Plant Protection Service

Mean of 9 trials (2 in 1981, 7 in 1982)

Crop stage - First Petal Fall

Fungicide	Dose rate g a.i./ha	% Stems Infected	Relative Yield
Untreated	-	32.3	100 (3.5 t/ha)
Iprodione flo	750	10.2	116.0*
'Other dicarboximide'	750	7.1	114.6*

*Significantly different from untreated control at 5% level

(b) Agrotec GmbH

Mean of 9 sites (2 in 1981, 7 in 1982)

Crop stage - First Petal Fall

Fungicide	Dose rate g a.i./ha	% Stems Infected	Relative Yield
Untreated	-	25.5	100 (3.5 t/ha)
Iprodione flo	750	6.5	116.7*
Iprodione W.P.	750	6.6	114.2*
'Other dicarboximide'	750	6.0	111.0*

*Significantly different from untreated control at 5% level

DISCUSSION

Trials in France indicate that Alternaria is controlled by a single treatment of iprodione at 500g a.i./ha applied at the 20 pod stage (Table 1). Increase in dose was not reflected in yield response. A further treatment may be required if disease pressure persists throughout the maturation period.

Comparisons of fungicides for Alternaria control in State Institutes in UK (Humpherson-Jones - Pers.Comm) and in Sweden (Svensson & 1983) have shown iprodione to be the most effective material. The latter worker found oil content of treated seed was increased, an effect also noted in UK at High Mowthorpe Experimental Husbandry Farm (S.Ogilvy - Pers.Comm).

An earlier spray for Alternaria may also prevent the development of stem lesions caused by Botrytis, thus the spray at early pod formation will give control of both diseases (Table 2).

For Sclerotinia control it is necessary to increase the dose rate of iprodione to 750g a.i./ha, coupled with the need to spray at the first petal fall stage.

Results from Denmark (Table 3) and W.Germany (Table 4), show good disease control and yield increases of up to 0.3 t/ha, which well justify the cost of treatment. Similar good control in France has been noted by Glemas (1981).

The effect of iprodione on the preservation of green tissue is of great significance. The importance of pod walls as vital photosynthetic organs has been noted by Hozyo et al (1972) in the achievement of high yields in rape.

It would appear therefore that we may be approaching a stage in the husbandry of oilseed rape where a programmed approach to fungicide treatments is desirable. If this should be the case, iprodione would be ideally suited to meet this requirement.

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