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FIELD ASSESMENT OF FUNGICIDES FOR THE CONTROL OF RUST OF PEANUTS

By

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Seven fungicides were tested for their efficacy in controlling rust of peanut (*Arachis hypogea* L.) caused by *Puccinia arachidis* Sepp. Of these, 2-iodobenzoic acid anilide was highly efficacious irrespective of date of sowing. The plants also gained in vigour and became deep green. Although N-tridecyl-2,6-dimethyl morpho-
iine was effective, it caused mild phytotoxicity. 2-methyl-5,6-dihydro-4-H pyran-3-
-carboxylic acid anilide was more effective on the January sown crop but caused moderately severe phytotoxicity. (Zinc) manganese ethylene-bis-dithiocarbamate in combination with 19% nickel sulphate and 2,3-dihydro-5-carboxy-anilido-6-methyl-1,4-oxanthiin had very little effect on the October sown crop. None of the fungicides had any effect on the tikka disease of peanuts caused by *Cercospora personata*.

INTRODUCTION

Rust of peanut (*Arachis hypogea* L.) caused by *Puccinia arachidis* Speng. was first reported from U. S. A. (Arthur, 1920). An extensive review by Bromfield

(1971) emphasised the lack of information on epidemiology and fungicidal control measures. In India, the disease appeared in the early seventies and since then has been reported from various parts of the country (Bhama, 1972 ; Chahal and Chohan, 1971; Goswami, 1974; Khosla *et al.*, 1975; Ramakrishna and Subh-ayya, 1973; Shanmugham *et al.*, 1972; Yadav *et al.*, 1975). Dithane M-45 has been claimed to be effective, alone (Arneson, 1970 ; Harrison, 1972, 1973 ; Padmanabhan *et al.*, 1977) and in combination with nickel sulphate (Arneson, 1970). Other fungicides claimed to be effective include carboxin (Patil and Kalekar, 1974), nickel chloride (Seshadri, 1975), Bravo or Daconil, Tetrachloroisophthalonitrile. (Harrison, 1973 ; Padmanabhan *et al.*, 1977).

In W. Bengal, peanuts can be grown throughout the year. The disease, first reported in the State (Sharma and Mukherjee, 1972), has been found to increase in intensity over the years. The disease was most severe during the hot and humid months and least in the winter. The efficacy of seven fungicides was assessed on crops raised in different seasons of the year and are reported.

MATERIALS AND METHODS

The seven fungicides selected for assesment were :

1. (Zinc) manganese ethylene-bis-dithiocarbamate (Dithane M-45, 75% WP) + nickel sulphate (19%)
2. 2-methyl-5, 6-dihydro-4 H-pyran-3-carboxylic acid anilide (Pyracarbolid, 50% WP)
3. 2-iodobenzoic acid anilide (Benodanil, 50% WP)
4. N-tridecyl-2,6-dimethyl morpholine (Tridemorph, 75% LC)
5. 4-n-butyl-4 H-1,2,4-triazole (Indar, 70% LC)
6. 2-methyl-furan-3-craboxanilide (Fenfuram, 75% WP)
7. 2,3-dihydro-5-craboxyanilido-6-methyl-1, 4-oxanthiin (Carbixin, 75% WP)

Of these, Pyracarbolid, Benodanil, Tridemorph and Indar were tested on the first two dates of sowing and the remaining fungicides were included only on the crop raised on the last date of sowing.

Peanut variety TMV 7, observed to be fairly susceptible, was sown on 15th January, 12th May and 6th October, 1976, in replicated 4 x 2.25 m plots in a randomised block design. Two separate crops were raised on the first date of sowing.

The disease symptoms appeared on the lowest leaves 3-4 months after sowing. On appearance of disease, the fungicides were sprayed in specified dosage, twice at 15 day intervals in January and May sown crops and at 20 days interval on the October sown crop. After 15 days of the last spray, the disease was rated on a 0 — 5 scale with 0 as healthy (a few scattered spots) and 5 where all foliage were heavily loaded with rust pustules.

RESULTS AND DISCUSSION

Benodanil and Tridemorph were found to be uniformly effective in reducing the intensity of rust of peanuts. Pyracarbolid was more effective on the January sown than on the May and October sown crops. Although Indar was significantly effective at $P = 0.05$, its efficiency in controlling the disease was far less than Benodanil or Tridemorph (Table 1). The results showed that date of sowing had little effect on the efficacy of these fungicides, except Pyracarbolid, in controlling the disease. In general, the intensity and the subsequent progress of the disease was 'slow' during the winter (8-12°C).

Of the effective fungicides Pyracarbolid and Tridemorph caused phytotoxicity. Spraying Pyracarbolid caused yellowing at tips and margins that progressed inwards. Tridemorph treated plants showed pin head, brown, necrotic spots on the leaf surface. On the other hand Benodanil treated plants showed vigorous growth and leaves became deep green in colour.

Unlike earlier reports (Arneson, 1970), Dithane M-45 in combination with nickel sulphate was found to have very mild effect on the incidence of disease in the October sown crop, where spray application was done in the winter (January, 1977). Similarly, Carboxin, claimed to be highly promising by Patil and Kalekar (1974), was not found to be promising. Patil and Kalekar's experiments were conducted on April sown crop.

Table 1. Field assessment of fungicides for the control of rust of peanuts

Treatment	Rate (Kg/ha)	Disease index 1,2			
		Date of sowing			
		January	May	October	
Pyracarbolid ⁴	0.75	3.12	3.12	4.10	4.10
Benodanil	0.75	1.10	1.15	1.15	1.20
Tridemorph ⁴	0.9L	1.60	1.60	1.30	1.60
Inder	1.05L	4.20	4.30	4.20	4.40
Dithane M--45 + NiSO ₄	1.12+ 0.3	—	—	—	4.40
Fenfuram	1.12	—	—	—	5.00
Carboxin	1.12	—	—	—	4.50
Control	—	5.00	5.00	4.75	4.80

1. Calculated on 0--5 scale : 0 - a few scattered spots ; 1 - 15% leaf area per plant covered with pustules ; 2 - 30% ; 3 - 50% ; 4 - 70% ; 5 - 100%-all leaves of plants almost covered with pustules.
2. Values not sharing the same letter are significantly different (P=0.05) as determined by Duncan's multiple range test.
3. Rate of a. i. based on a 9.9 sq. m. spraying schedule.
4. Caused phytotoxicity.

Of the anilido compounds only Benodanil showed promise. This would indicate that it is the moiety attached to the carboxyanilido group that determines the effectivity of these compounds against rust of peanut. Similar observations with other pathogens have been made earlier by Pommer and Zwick (1974).

The *Cercospora personata* leaf spots developed simultaneously, particularly in January and May sown crops. None of the fungicides screened were effective in preventing the disease.

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