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Aerobiological Studies on *Alternaria brassicae* and *Alternaria brassicicola* in Relation to *Streptomyces rochei*

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The aerial parts of higher plants growing under natural environmental conditions are populated with varied and large microbial organisms. These microbes settle down on plant surface from air as they are disseminated through air currents. A few of these are able to grow extensively on the surface of healthy plant parts and cause infection, and some play a protective role. Culture studies under lab. conditions carried out by Sharma (1976) showed that *Streptomyces rochei*, isolated from the surface of brown *sarson*, was antagonistic to *Alternaria brassicae* and *A. brassicicola*, the causal agents of leaf blight disease of brown *sarson*. Further, the activity of this organism was seen against the leaf blight causing pathogens on the surface of brown *sarson* plants by 'impression method' (Benett & Furnidge 1956), and its antagonistic behaviour was confirmed. The present paper deals with the presence of the pathogenic spores in the air over a brown *sarson* field in relation to *Streptomyces rochei* (the antagosnistic organism).

During the *rabi* season the aerobiological studies of both the pathogens of brown *sarson* and *Streptomyces rochei* (antagonistic organism) were carried out at Agra from October 1973 to April 1974 in a field of brown *sarson*. Using culture plate method, Rajan et al. (1952) ten petridishes (5 containing Czapek's and 5 with Martin's Rose Bengal media) were exposed at 4 hourly intervals (4.00 a.m., 8.00 a.m., 12.00 noon, 4.00 p.m., 8.00 p.m. and 12.00 p.m.) in each month for 5 minutes at 4 feet height level. Thus only 60 plates were exposed in each month. After the exposure the plates were incubated at 28°C$\pm$1°C for 5-7 days. Colonies of each pathogen and *Streptomyces rochei* appearing in the plates were counted and population/100 cm^2 was calculated. Temperature and relative humidity in the field were also recorded at the time of exposing the plates.

The climatic conditions played an important role in the trapping of spores. Data given in table show that low temperature and high humidity of the air might have adversely affected the deposition of pathogenic conidia, whereas, comparatively high temperature (25-28°C) and low relative humidity (63-79%) favoured the same. Conidia of both the pathogens were intercepted from the air during entire period of

Table 1 *Seasonal variations in the population of pathogens of brown sarson and Streptomycos rochei*

(Mean of 60 observations)

Organism	Population in colonies/100 cm²						
	Oct.	Nov.	Dec.	Jan.	Feb.	March	April
Alternaria brassicicola (Schow.) Wiltshire	0.69	0.14	0.93	2.45	1.77	5.34	3.36
Alternaria brassicae (Bark.) Sacc.	0.99	0.52	0.54	1.60	0.76	5.39	5.22
Streptomyces rochei	0.76	1.57	1.01	0.84	1.25	0.42	0.50
Temp. °C	25.5	20.5	17.4	13.8	12.9	25.4	28.2
RH%	79.5	80.5	81.3	82.8	85.5	75.8	63.0

gowth. The maximum population of *A. brassicae* (5.39 colonies/100 cm^2) and *A. brassicicola* (5.34 colonies/100 cm^2) was registered in the month of March when maximum disease intensity was seen in the field. Similar results were obtained by Satya Parkash (1968) while working on chillies, Padmanabhan et al. (1953). Over a paddy field and Sreeramulu (1964) over a barley field.

Further, it was observed that the conidia of both the pathogens were trapped from the air at all hours of exposure during the entire period of crop. However, the conidia of *A. brassicicola* could not be intercepted during the month of November in the 'morning' (8.00 a.m.), 'noon' (12.00 noon) and 'afternoon' (4.00 p.m.) hours. The maximum concentration of these pathogenic forms was seen in the 'noon' (12.00 noon) exposures during March. Similar findings were given by Sreeramulu and Seshavatarum (1962).

The spores of *Streptomyces rochei* were encountered throughout the crop season at all hours of exposure except 'early night' (8.00 p.m.) in December and 'afternoon' (4.00 p.m.) hours in the month of January. It is interesting to note that with decrease of the population of this organism in the air there was an increase in the population of the two pathogens. The results stand in conoformity with the work of Satya Parkash (1968).

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