

SURVEY OF SPRING SUNFLOWER DISEASES IN THE IRRIGATED AREAS OF PUNJAB, PAKISTAN.

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SUMMARY

During 1986 a survey of spring sunflower crop was conducted to determine the prevalence of various diseases with special emphasis on charcoal rot caused by *Macrophomina phaseolina*. In total twenty three key locations were visited. The crop was largely free of diseases and doing very well in general. There was a minor attack of head rot (c.o. *Rhizopus* sp.) at eight sites. Charcoal rot was observed only at five places and that also in patches. Root samples of apparently healthy and diseased plants from randomly selected sites were brought for assessment of *M. phaseolina* infection. Root plating on CMR Agar (Chloroneb-Mercuric chloride-Rosebengal Agar) revealed the presence of *M. phaseolina* in roots of both apparently healthy and diseased plants. Interestingly, charcoal rot was observed only at those sites where farmers had not managed the irrigation schedule properly.

INTRODUCTION

Oilseed sunflower (*Helianthus annuus*) is a relatively new crop in Pakistan. Efforts are underway to increase both its area and yield to bridge the edible oil gap in the country. Production technologies suitable to different ecological zones are being worked out and work is being done on the pathological problems of sunflower. More than a dozen diseases including charcoal rot (*Macrophomina phaseolina*), leaf spots (*Alternaria helianthi*, *Septoria helianthi*), head rot (*Rhizopus* sp., *Sclerotinia sclerotiorum*), rust (*Puccinia helianthi*), powdery mildew (*Erysiphe cichoracearum*), stalk rot (*S. sclerotiorum*) and collar rot (*Sclerotium rolfsii*) have been reported from Pakistan (Mirza and Beg, 1983; Mirza and Khokhar, 1985; Mirza Ahmad and Beg, 1985). Charcoal rot is the most serious, limiting sunflower production followed by head rot and leaf spots (Mirza, Ahmad and Beg, 1984). Limited information is available on the prevalence of these diseases in different sunflower production areas. Sunflower is being grown in provinces of NWFP, Punjab and Sind, however irrigated areas of Punjab form the major production nucleus. This study reports the prevalence of various sunflower diseases, with special emphasis on charcoal rot, in spring sunflower in the irrigated areas of Punjab province.

MATERIALS AND METHODS

The survey of the spring sunflower growing areas in Punjab was conducted during 1986. In total twenty three key locations were visited during crop maturity to determine the prevalence of charcoal rot, leaf blight, rust, powdery mildew and downy mildew (table 1, fig. 1). The data on disease severity was taken according to ratings; no disease attack (-), low (+), medium(++)

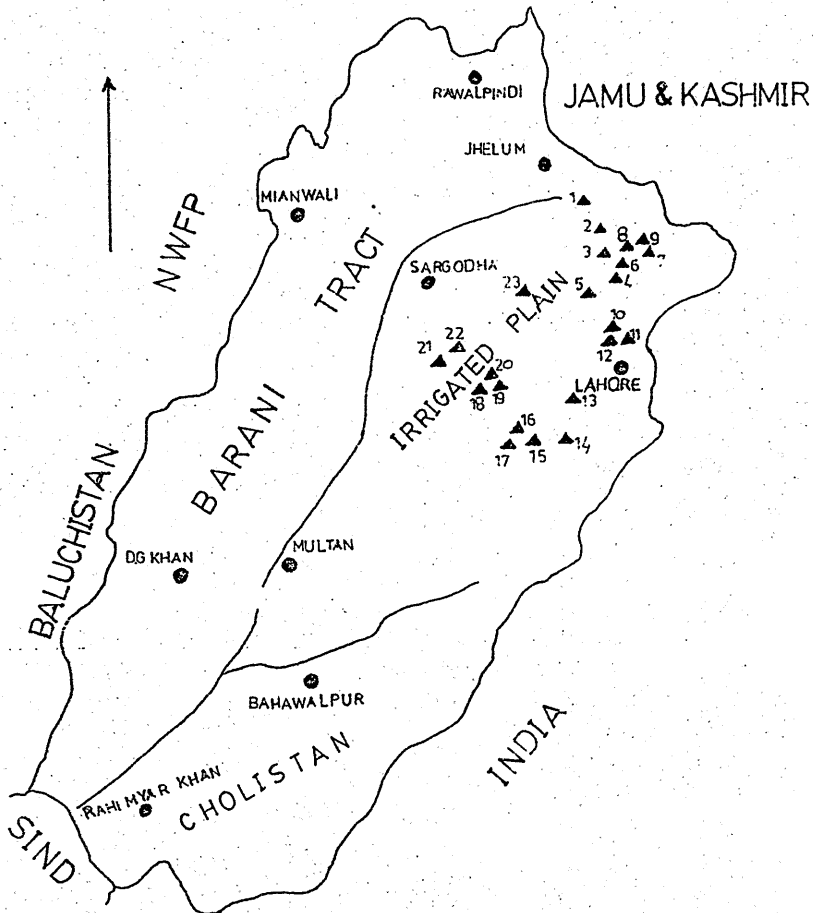


FIG.1
 LOCATIONS (▲) SURVEYED FOR SUNFLOWER DISEASES IN
 THE IRRIGATED AREAS OF PUNJAB, PAKISTAN.

Table-1: SUNFLOWER DISEASE SURVEY IN IRRIGATED AREAS OF PUNJAB

S.No. Location	Type of Damage *								Crop production
	Charcoal rot	Head rot	Alternaria blight	Rust	Downy mildew	Powdery mildew	Bird damage	Hail/rain/excess irrigation damage	
1. Lala Musa	-	-	-	-	-	-	-	-	Excellent
2. Wazirabad	-	-	-	-	-	-	-	-	Excellent
3. Ghakhar	-	-	-	-	-	-	-	-	Excellent
4. Aarcoop	-	-	-	-	-	-	-	-	Excellent
5. Bhorba Kalan	-	-	-	-	-	-	-	-	Excellent
6. Nandipoor	-	-	-	-	-	-	-	+++ (Lodging and hail damage)	Bad
7. Sohain	-	-	-	-	-	-	-	+++ (Lodging and hail damage)	Bad
8. Kotli Syedan	-	-	-	-	-	-	+	++ (Lodging and hail damage)	Fair
9. Daska	-	-	-	-	-	-	-	-	Excellent
10. Kato Rora	-	-	-	-	-	-	-	-	Excellent
11. Seokee	-	-	-	-	-	-	-	-	Good
12. Seol	-	-	-	-	-	-	-	-	Excellent
13. Manga Mandi	+	+	-	-	-	-	-	-	Over all
14. Bhaipharoo	++	+	-	-	-	-	-	+(Hail damage lodging)	Excellent
15. Head Balloki	-	-	-	-	-	-	-	-	Fair to bad
16. Head Balloki (SA)	-	-	-	-	-	-	-	-	Excellent
17. Head Balloki (SI)	-	-	-	-	-	-	-	-	Excellent
18. Faisalabad AARI	+	+	-	-	-	-	-	-	Good
19. Faisalabad Saigal Farm	++	+	-	-	-	-	-	-	Fair
20. Faisalabad (Agri. Univ.)	-	+	-	-	-	-	-	-	Excellent
21. Chinot	-	-	-	-	-	-	-	-	Excellent
22. Rao Bagh	++	++	-	-	-	-	-	+++	Bad
23. Hafizabad	-	-	-	-	-	-	-	-	Good

*(-) No disease attack or damage, (+) Low, (++) Medium, (+++) Heavy disease attack.

and heavy disease attack (+++). In addition to diseases, data was also taken on bird, hail, rain and excess irrigation damage as well as general crop condition. Root samples of apparently healthy and diseased plants from randomly selected sites were also brought for assessment of *M. phaseolina* infection. Root samples were thoroughly washed in running tap water for half an hour, surfaced sterilized in 1 percent sodium hypochlorite solution for ten minutes then rinsed in sterile distilled water and plated on a selective medium (Chloroneb-Mercuric chloride-Rosebengal Agar) according to Short, Wyllie and Bristow (1980). The plates were incubated at 32°C in dark and observed for growth of *M. phaseolina* from roots. During the course of the survey farmers, whose fields were visited, were also interviewed about the management practices and irrigation schedule.

RESULTS

The survey revealed that sunflower crop in the irrigated areas of Punjab was largely free of diseases and doing very well in general (table 1). Of the twenty three locations visited none had *Alternaria* blight, rust, downy mildew or powdery mildew. Head rot caused by *Rhizopus sp.* was observed at eight locations; of these seven had a low disease attack while one site had moderate head rot incidence. Charcoal rot was noticed at only five places and that also in patches. At two of these places the intensity was low while at the other three locations disease attack was moderate. During the survey, sunflower crop was also scored for bird, rain or excess irrigation damage. Most of the sites were free of such damage (table 1).

Root samples of sunflower were brought from ten sites selected randomly out of the twenty three locations that were surveyed (table 2). Plating on a selective medium (CMR) for *Macrophomina phaseolina* showed hundred percent infection of the plants at all the ten sites. However, disease symptoms were found at only two sites (table 2). Discussions with farmers revealed that the fields where charcoal rot symptoms were observed had not received irrigation according to proper schedule.

DISCUSSION

It is apparent from the results of present survey that diseases were not a big problem in spring sunflower in the irrigated areas of Punjab in 1986. Although root samples of sunflower crop from selected locations showed hundred percent *M. phaseolina* infection, charcoal rot was found at only those places where plants were under stress due to improper irrigation scheme. A similar situation was found in barani tract of Punjab where root samples from both high and low rainfall areas showed the presence of *M. phaseolina* but disease expressed itself in low rainfall areas only (Ahmad and Burney, unpublished). Although age of the plants appears to be an important factor influencing infection and older plants, particularly during flowering and seed-development stage, are predisposed to attack of *M. phaseolina* (Kolte, 1985; Zazzerini et al, 1985). However, infection may occur in the seedling stage but remain latent with disease expressing itself during later stages of crop growth under stress conditions of high temperature and low moisture (Edmund, 1964;

TABLE 2. *Macrophomina phaseolina* INFECTION AND CHARCOAL ROT INCIDENCE IN SPRING SUNFLOWER AT TEN RANDOMLY SELECTED SITES IN IRRIGATED AREAS OF PUNJAB

LOCATION	PERCENT ROOTS INFECTED	DISEASE* INCIDENCE
WAZIRABAD	100	-
GHAKHAR	100	-
BHOBRA KALAN	100	-
KOTLI SYEDAN	100	-
DASKA	100	-
KATO RORA	100	-
BHAIPHAROD	100	++
HEAD BALLOKI	100	-
FAISALABAD (ARRI)	100	+

* (-) No disease attack, (+) low, (++) Medium, (+++) Heavy disease attack.

Meyer, 1974). The present studies suggest that there is no danger of damage to sunflower crop due to charcoal rot, in spite of *M. phaseolina* infection, if the farmers manage the irrigation schedule properly and do not allow the stress conditions to prevail during crop growth.

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