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PREVALENCE AND INCIDENCE OF SUNFLOWER DISEASES IN PAKISTAN

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SUMMARY

A field survey was carried out during 1991 to assess the distribution and incidence of various sunflower diseases in different agro-ecological zones of Pakistan. In total, 1400 acres of sunflower crop from 45 localities were inspected and 9 fungal and one bacterial disease were recorded. The number of diseases recorded differed among the regions and their distribution and incidence broadly corresponded to the intensity of sunflower production. *Alternaria* leaf spot and charcoal rot were observed in all the regions and were most severe with highest incidence of 80 and 90 percent, respectively. Powdery mildew and bacterial rot were also found to be emerging pathological problems particularly in the Punjab province.

Key words: Sunflower diseases, Pakistan

INTRODUCTION

Worldwide interest in cultivation of sunflower crop was aroused during the 1960's and, by 1980, it was the second most important source of edible vegetable oil in the world (Sackston, 1981). In Pakistan, oilseed sunflower (*Helianthus annuus*) is also a relatively new crop. Efforts are under way to increase both its area and yield in order to bridge the edible oil gap in the country which is increasing at the rate of 11.0% per annum (Beg, 1983). In 1991-92, 63328 hectares of the crop were grown and a total production of 83312 mt. was harvested (Annonymous, 1991). However, the average yield was only 1032 kg. per hectare which is lower than the biological potential (2875 kg/ha) of the existing cultivars in Pakistan (Beg, 1983). From germination to harvest, sunflower is attacked by many diseases which, under certain climatic conditions, reduce the yield and quality significantly (Mirza and Beg, 1983).

The expansion of the area is leading to major disease and pest problems. So far, sixteen diseases including charcoal rot (*Macrophomina phaseolina*), leaf spot (*Alternaria helianthi, Septoria helianthi*), head rot (*Phizopus* sp. and *Sclerotinia sclerotiorum*), stalk rot (*S. sclerotiorum*) and collar rot (*Sclerotiorum rolfsii*) have been reported from Pakistan (Mirza and Beg, 1983; Maširević et al., 1987; Ahmad, 1988 and Burney et al., 1988 and Bhutta et al., 1993). The relative importance of sunflower diseases varies annually with climate and management practices. Research on the prevalence and incidence of diseases is a major tool in modern disease management technology (Weltzien, 1981).

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Information on distribution and incidence of various field diseases is poor. A comprehensive field survey was carried out during 1991 to know the prevalence and incidence of various sunflower diseases in major sunflower growing areas in Pakistan. The results are reported in this paper.

MATERIALS AND METHODS

Survey of 45 localities covering 1400 acres of sunflower crop was conducted during May, 1991, in main sunflower growing areas of three provinces (Punjab, Sindh, and NWFP) of Pakistan (Figure 1). In each field, 1000 plants at 5 spots were examined on a diagonal path as described by Aćimović (1978). Number of plants showing symptoms of particular disease were counted and results were expressed in percentages. Disease severity was assessed on a visual rating scale from 0-5.

RESULTS AND DISCUSSION

A total of 45 localities comprising 1400 acres of sunflower crop was surveyed to assess the prevalence and incidence of various diseases in the Punjab, Sindh and NWFP during 1991. Ten diseases, of which nine were fungal and one bacterial were prevalent with varying intensities (Table 1). Out of 45 localities surveyed, only 8 (17.7%) were found disease free. Six localities were in Punjab and one in each Sindh and NWFP. No new disease was observed during this survey.

Alternaria leaf spot (*Alternaria tenuis, A. helianthi*) and charcoal rot (*Macrophomina phaseolina*) were prevalent in a number of localities with highest incidence, 80.0 and 60 percent at Manga Mandi in Punjab and at Takht Bai in NWFP, respectively. Head rot (*Rhizopus* sp., *Botrytis cinerea*, and *S. sclerotiorum* sp.) was found severe in Punjab (95.0%) and Sindh (20.0%). This sporadic occurrence of head rot may be due to rain during head and flowering stage (Mirza and Beg, 1983). These three diseases were widely prevalent throughout the sunflower growing areas of Pakistan (Mirza and Beg, 1983; Mirza, 1984; and Maširević et al., 1987). Maširević et al., 1987, observed no disease symptoms of *Septoria* leaf spot, *Verticillium* and *Sclerotinia* wilt, *Phomopsis* and *Phoma* leaf spots in NWFP. But in the present survey, all above mentioned diseases were present in NWFP except *Sclerotinia* rot and *Phoma* leaf spot (Table 1).

Bacterial rot (*Erwinia* sp) *Septoria*, *Phomopsis* and *Phoma* leaf spots were not observed in the Sindh province that confirmed the observation reported in 1987 survey by Maširević et al. Bacterial blight was observed only in Punjab but with incidence ranging from 0.0-10.0 percent on disease scale 0-3. Powdery mildew (*Erysiphe cichoracearum*) was earliest observed during 1982 survey by Mirza and Beg (1983). But it was not reported during the 1987 survey by Maširević et al. In the present survey, it was found throughout Punjab, Sindh and NWFP. The maximum incidence was 30.0 percent at Sahiwal area in the Punjab province.

High incidence of various sunflower diseases observed in this survey may suggest that pathological problems in sunflower crop are increasing in Pakistan. Apart from the dominant prevalence and incidence of charcoal rot and *Alternaria* leaf spot, bacterial rot and powdery mildew are the emerging pathological problems particularly in the Punjab province.

Table-1 Prevalence and incidence of various sunflower diseases observed during field survey 1991 in Pakistan.

S.No.	Field diseases	PUNJAB				SINDH				N.W.F.P.			
		Locality % age infected out of total (31) surveyed	Incidence %age		Disease severity on scale 0-5	Locality % age infected out of total (6) surveyed	Incidence %age		Disease severity on scale 0-5	Locality % age infected out of total (8) surveyed	Incidence %age		Disease severity on scale 0-5
			Range	Mean			Range	Mean			Range	Mean	
1.	Charcoal rot.	29.00	0.0-9.0	3.87	0-5	66.67	0.0-15.0	4.50	0-4	62.50	0.0-60.0	8.37	0-5
2.	Head rot.	25.80	0.0-95.0	4.25	0-5	83.33	0.0-20.0	6.83	0-4	12.5	0.0-2.0	0.13	0-2
3.	Sclerotinia rot.	9.68	0.0-10.0	0.52	0-3	16.67	0.0-2.0	0.33	0-1	0	0	0	0
4.	Collar rot.	22.58	0.0-5.0	0.55	0-2	16.67	0.0-2.0	0.17	0-2	12.5	0.0-1.0	0.13	0-1
5.	Bacterial rot.	29.03	0.0-10.0	0.80	0-3	0	0	0	0	0	0	0	0
6.	Alternaria leaf spot.	61.29	0.0-80.0	6.29	0-4	100.0	1.0-12.0	7.5	0-3	62.5	0.0-25.0	6.87	0-3
7.	Septoria	6.45	0.0-1.0	0.07	0-1	0	0	0	0	12.5	0.0-1.0	0.13	0-1
8.	Phomopsis leaf spot.	16.13	0.0-20.0	0.90	0-4	0	0	0	0	62.5	0.0-30.0	5.75	0-4
9.	Phoma leaf spot.	6.45	0.0-3.0	0.16	0-1	0	0	0	0	0	0	0	0
10.	Powdery mildew.	16.13	0.0-30.0	1.42	0-3	16.67	0.0-2.0	0.34	0-1	12.5	0.0-5.0	0.83	0-2

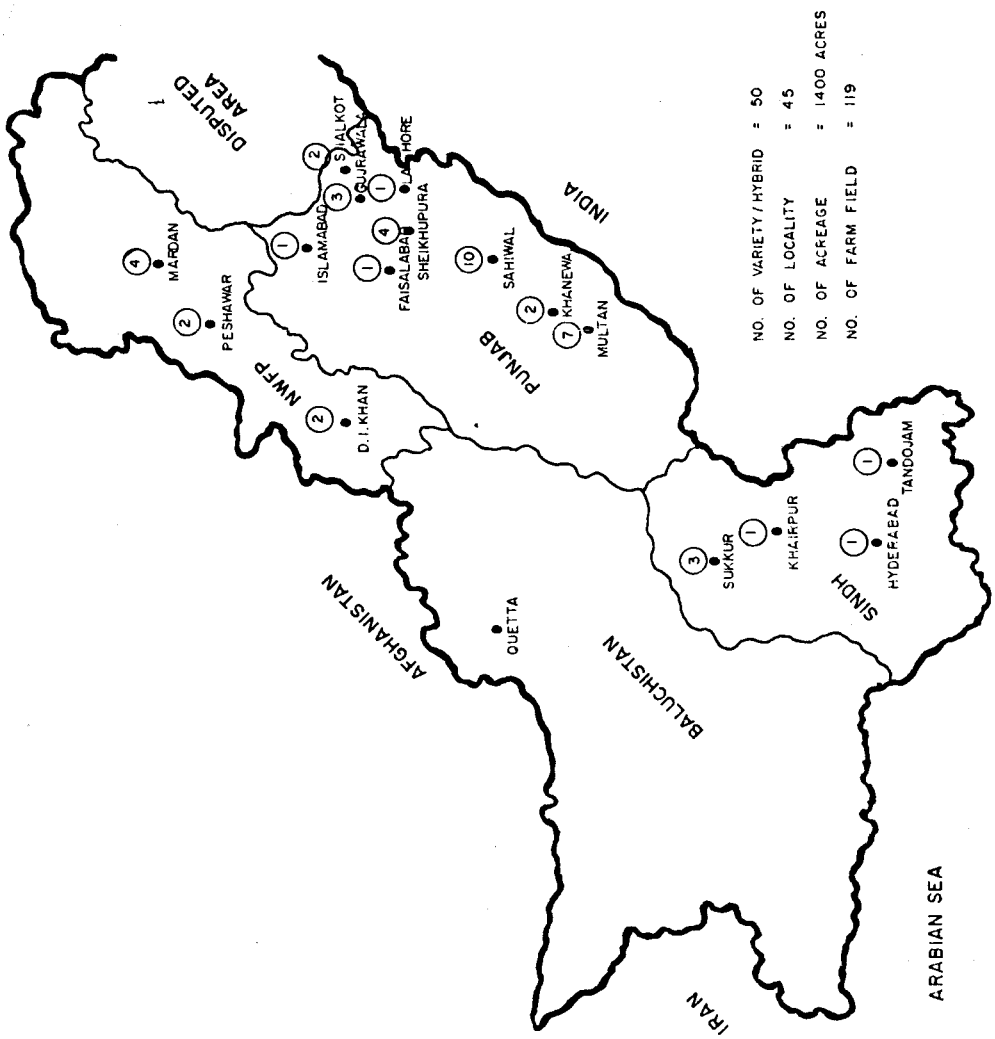

Figure 1. Location surveyed for sunflower field crop diseases in Pakistan during May-June 1991.

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FRECUENCIA E INCIDENCIA DE ENFERMEDADES DE GIRASOL EN PAKISTAN

RESUMEN

Una prospección del campo fué llevada a cabo durante 1991 para valorar la distribucción e incidencia de varias enfermedades de girasol en diferentes areas agrocólogicas de Pakistan. En total se inspeccionaron 1.400 areas de cultivo de girasol de 45 localidades y 9 enfermendades causadas por hongos y una bacteria fueron registradas. El número de enfermedades registradas varió entre las regiones y su distribución e incidencia correspondió ampliamente al la intensidad de la producción de girasol. La mancha foliar producida por Alternaria y la podredumbre carbonosa fueron observadas en todas las regiones y fueron más severas con la incidencia una alta de 80 y 90 respectivamente. El oidido y la podredumbre bacteria-na fueron tambien detectadas como problemas patológicos nue-vos particularmente en la provincia de Punjab.

FRÉQUENCE ET INCIDENCE DES MALADIES DU TOURNESOL AU PAKISTAN

RÉSUMÉ

Une enquête au champ a été effectuée en 1991 afin d'estimer la distribution et l'incidence de divers maladies du tournesol dans les différentes régions agroécologiques du Pakistan. Au total 1400 acres de culture de tournesol sur 45 localités ont été étudiées: 9 maladies fongiques et une bactériose ont été recensées. Le nombre de parasites répertorié diffère selon les régions, leur distribution et leur incidence correspondant largement au niveau de production du tournesol. L'alternariose et *Macrophomina phaseoli* ont été observées dans toutes les régions avec des incidences maximale de 80 et 90% respectivement. Du powdery mildiou et une pourriture bactérienne se sont révélés être de nouveaux problèmes pathologiques particulièrement dans la province du Punjab.