DISEASES OF SUNFLOWER IN PAKISTAN, 1982

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A breeding programme is under way at the National Agricultural Research Centre, Islamabad, aiming at developing sunflower hybrids. Beside the established oilseed crops, sunflower, a relatively new crop, is being considered to be the most important source of edible vegetable oil to bridge the gap of edible oil requirement in Pakistan. The area under sunflower cultivation in 1981 was 2,718 hectares and it is expanding gradually. The average yield was 813 kg/ha, however lower than the biological potential of the existing cultivars and this could be ascribed mostly to fungal diseases. From seed germination to harvest, sunflower is attacked by more than 35 infectious micro-organisms, mostly fungi which under certain climatic conditions reduce the yield and quality significantly. It has been estimated that diseases cause an average annual loss of 12 percent in yield from nearly 12 million ha of sunflower in the world (Z i m m e r and H o e s, 1978).

Disease problems are not well understood as they are present more on the established crops such as cotton, rape and mustard. The relative importance of sunflower diseases varies annually with climate and management practices. Therefore surveys of experimental plots and several grower's fields in central and southern regions of the country were carried out for the first time in 1982. The results are reported here.

MATERIALS AND METHODS

F.A.O. sunflower experimental plots at the National Agricultural Research Centre, Islamabad, containing different cultivars, consisted of five meters long, 4 rows, 0.60 cm apart. To determine the incidence of wilt complex *(Macrophomina phaseoli* (Maubl.) Ashby and *Sclerotinia sclerotiorum* (Lib.) de Bary and head rot *(Rhizopus* sp.) all the plants in 4 rows of each cultivar and 100 plants at 5 spots in grower's field were examined on diagonal path (A č i m o v i ć, 1978). By counting the number of wilted plants/rotted heads, average percentages were calculated.

For foliar diseases, leaf spots *(Septoria helianthi* Ell & Kell. and *Alternaria helianthi* (Hansf.) Tubaki & Nishihara) and *(Puccinia helianthi* Schw.), five plants were examined randomly at 5 spots and evaluated on the scale from 0—4 (A č i m o v i ć, 1978). Sunflower cultivars Argentario, Ala, IS-894, Noor and Hysun were encountered.

RESULTS AND DISCUSSION

Observations in the F.A.O. sunflower experimental plots containing different cultivars and commercial plots of varieties Argentario and Ala at the National Agricultural Research Centre Islamabad, in 1982, indicated that five diseases, wilt complex *(Macrophomina phaseoli* and *Sclerotinia sclerotiorum),* head rot *(Rhizopus* sp. and *Sclerotinia sclerotiorum)* and foliar diseases, leaf spots *(Septoria helianthi* and *Alternaria helianthi),* rust *(Puccinia helianthi)* were present throughout the growing season, while powdery mildew *(Erysiphe cichoracearum* DC) developed only on a few plants late in the season. The incidence of different diseases is summarized in Table 1.

It was noted that no experimental and commercial plots were completely free of diseases under natural field conditions and it was common to find two or more diseases in the same plot and field. Local variety Noor was found to be attacked by all the diseases. The surveys (Table 1) showed that among the above recorded diseases, wilt and leaf spots diseases were the most prevalent and serious, limiting sunflower production, followed by head rot and rust in the spring and autumn crops at the National Agricultural Research Centre, Islamabad.

In the Punjab and Sind provinces, where 45 sunflower grower's fields were surveyed in May/June 1982, three diseases, wilt *(Macrophomina phaseoli),* head rot *(Rhizopus* sp.) and leaf spots *(Alternaria* sp.) were seen.

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Table 1

Incidence and severity of diseases on sunflower cultivars at NARC, Islamabad, during 1982

Cultivar	Wilt complex *M. phaseoli* & *S. sclerotiorum* (% wilted plants)	Leaf spot *S. helianthi* & *A. helianthi* (% leaf area affected)	Head rot *Rhizopus* sp. *S. sclerotiorum* (% infected heads)	Rust *P. helianthi* (% leaf area affected)	Powdery mildew *E. cichoracearum* (% leaf area affected)
Argentario	73	50	5	10	—
Ala	93	50	8	20	—
Peredovik	65	40	Traces	Traces	—
Sunbred 212	75	50	5	—	—
RO-40	90	30	2	5	—
Noor	90	60	10	10	Traces

The surveys showed that wilt and head rot occured throughout the irrigated sunflower growing areas where most fields, irrespective of cultivar, showed traces to 2 percent infection. In two fields (4 ha) of IS-894, incidence of wilt and head rot ranged from 10—80 percent and 2—10 percent wilted plant/rotted heads respectively in Bahawalpur (Punjab). The high incidence of wilt may be due to high temperature and restricted soil moisture. Head rot destroyed 50—70 percent of the heads and wilt incidence was up to 10 percent in four fields (20 ha) with Hysun variety at Multan (Punjab). This sporadic occurrence of head rot may be due to rains during heading and flowering stages.

At the Agricultural Research Institute Tandojam (Sind), the incidence of wilt (*M. phaseoli*), head rot (*Rhizopus* sp.) and leaf spot (*Alternaria* sp.) ranged from 5—50 percent wilted plants, traces to 10 percent infected heads and 5—53 percent leaf area respectively affected.

Other diseases such as rust, Septoria leaf spot and powdery mildew were not seen in Punjab and Sind provinces at the time when the survey was made.

CONCLUSIONS

The results of the 1982 surveys revealed that wilt (*M. phaseoli* and *S. sclerotiorum*) head rot (*Rhizopus* sp. and *S. sclerotiorum*) and leaf spots (*Septoria helianthi* and *Alternaria helianthi*) are the most prevalent and dangerous diseases of sunflower and could become epiphytotic and be a potential threat to sunflower production if favourable conditions i.e. long period of precipitations with short rainless intervals during the growing seasons occur. Wilt (*M.phaseoli*) is the most dangerous under high temperature and drought conditions. The rust (*P. helianthi*) and powdery mildew (*E. cichoracearum*) do not appear to be a serious problem at the present time, however incidence of more than one or two pathogens on sunflower cultivars warrants for their investigation in order to develop resistant cultivars/lines or other control measures.

LITERATURE CITED

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LES MALADIES DU TOURNESOL AU PAKISTAN, 1982

Résumé

L'attaque des maladies constitue l'une des principales causes de la réduction et de la dépréciation des récoltes enregistrées chaque année au Pakistan. Dans les conditions de 1982, les maladies suivantes ont été identifiées dans les cultures de tournesol : le flétrissement des plantes causé par *Macrophomina phaseoli* et *Sclerotinia sclerotiorum*, la pourriture du capitule (*Rhizopus* spp. et *Sclerotinia sclerotiorum*), la septoriose (*Septoria helianthi*), l'alternariose (*Alternaria helianthi*), la rouille (*Puccinia helianthi*) et le mildiou (*Erysiphae cichoracearum*). Les plus grandes pertes ont été produites par le flétrissement des plantes, la pourriture du capitule et par les maladies foliaires, ces maladies étant très répandues dans les cultures de tournesol, leur apparition et propagation dépendant en grande mesure des valeurs élevées de la température de l'air et de l'humidité du sol. La rouille et le mildiou ont été moins importants.

LAS ENFERMEDADES DEL GIRASOL EN PAKISTÁN, 1982

Resúmen

El ataque de enfermedades constituye una de las causas principales de la disminución y depreciación de la cosecha registradas año tras año en Pakistán. En las condiciones del año 1982, en las culturas de girasol se han identificado las siguientes enfermedades : el marchitamiento de las plantas (*Macrophomina phaseoli* y *Sclerotinia sclerotiorum*), la podredumbre del capítulo (*Rhizopus* sp. y *Sclerotinia sclerotiorum*), el manchado de las hojas (*Septoria helianthi* y *Alternaria helianthi*), la roya (*Puccinia helianthi*) y el enharinamiento (*Erysiphe cichoracearum*). Los mejores daños fueron produciodos por la marchitez de las plantas, la podredumbre de los capítulos y las enfermedades de las hojas, esas enfermedades siendo muy difundidas en las culturas de girasol su aparición y propagación dependiendo en gran medida de los valores elevados de la temperatura, del aire y la humidez del suelo. Menos importantes resultaron la roya y el enharinamiento.