

V. Plant Protection

1. Description and prevalence of maize and soybean diseases in Thailand (1973—1975)*

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The purpose of the study is to investigate the description and the prevalence of diseases in maize and soybean plants when upland crops such as maize and soybean are introduced into the paddy field of the central plain of Thailand.

Sorghum downy mildew, brown stripe downy mildew, curvularia leaf spot, southern leaf blight, northern leaf blight and others were recognized as important diseases of maize (Table 1-1). Among them, sorghum downy mildew was the most destructive disease for maize plants. The disease was distributed in all regions growing maize except the northernmost part of the country, seriously breaking out in wet season. So far as the authors observed, the disease did not appear anywhere in the 1973—'74 dry season. In the 1974—'75 dry season, the disease was observed in a limited number of fields (Table 1-2). However, downy mildew burst out on maize plants in the experimental field of the Suphnburi Rice Experiment Station in the 1974—'75 season (Fig.1-1). It was accepted that the inoculum was abundantly present in the field under the condition created by year round culture of maize. Special regard must be paid to the fact that eradication of the inoculum play an important role in preventing the downy mildew, when maize is introduced into paddy fields in dry season.

The fungus, possessing conidia of a different shape from those present in *Sclerospora sorghi*, was found on the affected leaves of sorghum downy mildew (Table 1-3). Species of the fungus will be identified after more careful investigation.

Curvularia leaf spot was a very common disease in Thailand and the disease was observed in every region growing maize. Causal organisms of curvularia leaf spot were isolated *Curvularia pallescens*, *C. lunata* and *C. lunata* var. *aeria*.

Southern leaf blight was recognized in the whole country, but the disease appeared in mild form in Central Thailand (Table 1-4). The prevalence of northern leaf blight was observed more severe in the northern part of Thailand than in the central plain.

Soybean rust was the most destructive disease in the area growing soybean in wet season (Table 1-5). It became evident that rust broke out seriously even in dry season when inoculum was present abundantly under conditions of all year round culture (Fig.1-2).

Moreover, soybean diseases were recognized as bacterial pustule, phyllosticta leaf spot, frog-eye leaf spot, alternaria leaf spot, downy mildew, anthracnose, sclerotium rot, fusarium wilt/blight, rhizoctonia blight, charcoal rot and so on (Table 1-6).

* More in detail, see: SUZUI, T. and KAMPHANGRIDTHRONG, T. (1979): The prevalence of maize and soybean diseases in Thailand. *Technical Bulletin of the Tropical Agriculture Research Center*, No.12, 1-31.

Table 1-1. Diseases of maize observed in Thailand from 1973 to 1975

Disease	Causal organism
Sorghum downy mildew	<i>Sclerospora sorghi</i> (Kulk.) Weston et Uppal Sclerospora sp.
Brown stripe downy mildew	<i>Sclerophthora ryssiae</i> var. <i>zeae</i> Payak et Renfro
Northern leaf blight	<i>Trichometasphaeria turcica</i> Luttrell (<i>Helminthosporium turcicum</i> Pass.)
Southern leaf blight	<i>Cochliobolus heterostrophus</i> (Drechsler) Drechsler (<i>Helminthosporium maydis</i> Nishik. et Miy.)
Curvularia leaf spot	<i>Curvularia lunata</i> (Wakker) Boedijn <i>C. lunata</i> (Wakker) Boed. var. <i>aeria</i> (Bat., Lim. et Was.) <i>C. pallescens</i> Boedijn
Rust	<i>Puccinia polysora</i> Underw.
Common smut	<i>Ustilago maydis</i> (DC.) Cda.
Water soaked curvularia leaf spot	<i>Curvularia pallescens</i> Boedijn <i>C. lunata</i> (Wakker) Boedijn
Bacterial wilt	unidentified
Purple leaf sheath	nonparasitic factor

Table 1-2. Number of fields observed for Sorghum downy mildew of maize in Thailand from 1973 to 1975

Location	1973	1973 — '74	1974	1974 — '75
	Wet season	Dry season	Wet season	Dry season
Central plain	13 / 24	0 / 8	7 / 11	1 / 7
North	3 / 13	0 / 6	7 / 21	0 / 2
North-east	3 / 3	0 / 1	8 / 18	1 / 1
South	—	—	0 / 10	—
Total	21 / 40	0 / 15	22 / 60	2 / 10

Remarks: Numerator is number of the diseased fields.
Denominator is number of the observed fields.

Table 1-3. Characteristics of *Sclerospora* downy mildew of maize observed in Thailand

Disease (* Symptom)	Pathogen	Length of conidiophore (μ m)	Basal cell	Size of conidia (μ m) mean (range)	Ratio of length/ breadth of conidia	Shape of Conidia	Germination	Remarks
Sorghum downy mildew	<i>Sclerospora sorghi</i>	190—660	Present	23x17 (14—41 x 12—25)	1.32	Globose, broadly ellipsoidal	Germ tube	
Do *	<i>Sclerospora</i> sp.	190—660	do	32x16 (21—44 x 12—21)	2.01	Oval, obovate with apiculus	do	
Brown stripe downy mildew*	<i>Sclerospora</i> sp.	208—468	do	30x15 (26—36 x 13—17)	1.97	do	do	
Sorghum downy mildew	<i>Sclerospora sorghi</i>	180—300	Present	15—29 x 15—27		Sub-orbicular	Germ tube	Weston et al. 1932
Philippine downy mildew	<i>Sclerospora philippinensis</i>	245—400	do	44x14 (31—58 x 11—16)		Cylindrical	do	Phitakpraiwan et al. 1974
Java downy mildew	<i>Sclerospora maydis</i>	180—300	do	28—45 x 16—22		Spherical subspherical	do	Dickson 1956 (from Butler 1913)
Sugarcane downy mildew	<i>Sclerospora sacchari</i>	160—170 (190—280)	do	25—41 x 15—23		Elliptical, cylindrical, ovate	do	Waterhouse 1964 (from Miyake 1911)

Table 1-4. Comparison of the occurrence of southern leaf blight of maize between the wet and the dry season from the viewpoint of the diseased plants in per cent

Diseased plants in per cent	Wet season		Dry season	
	Number of fields	Ratio	Number of fields	Ratio
more than		%		%
50%	6	14	0	0
49 — 11	22	50	3	16
less than				
10	14	32	7	39
0	2	5	8	45
Total	44	100	18	100

Table 1-5. Number of fields observed for soybean rust and degree of the disease in Thailand from 1973 to 1975

Year	Season	Number of the diseased field/ Number of field observed	Degree of disease
1973	Wet	4 / 9	Light to severe
1973 — 1974	Dry	8 / 20	Light
1974	Wet	17 / 17	Light to severe
1974 — 1975	Dry	2 / 4	Light

Table 1-6. Diseases of soybean observed in Thailand from 1973 to 1975

Disease	Causal organism
Mosaic	Virus
Bacterial pustule	<i>Xanthomonas phaseoli</i> (Smith) Dowson var. <i>sojense</i> (Hedges) Starr et Burkholder
Rust	<i>Phakospora pachyrhizi</i> Sydow
Downy mildew	<i>Peronospora manshurica</i> (Naoum) Sydow
Sclerotium rot	<i>Sclerotium rolfsii</i> Sacc.
Anthraxnose	<i>Colletotrichum truncatum</i> (Schw.) Andrus et Morre
Brown spot	<i>Septoria</i> sp.
Phyllosticta leaf spot	<i>Phyllosticta</i> sp.
Frogeye leaf spot	<i>Cercospora</i> sp.
Alternaria leaf spot	<i>Alternaria</i> sp.
Fusarium wilt/blight	<i>Fusarium oxysporum</i> , <i>F. solani</i>
Chacoal rot	<i>Sclerotium</i> sp.
Rhizoctonia blight	<i>Rhizoctonia solani</i> Kühn

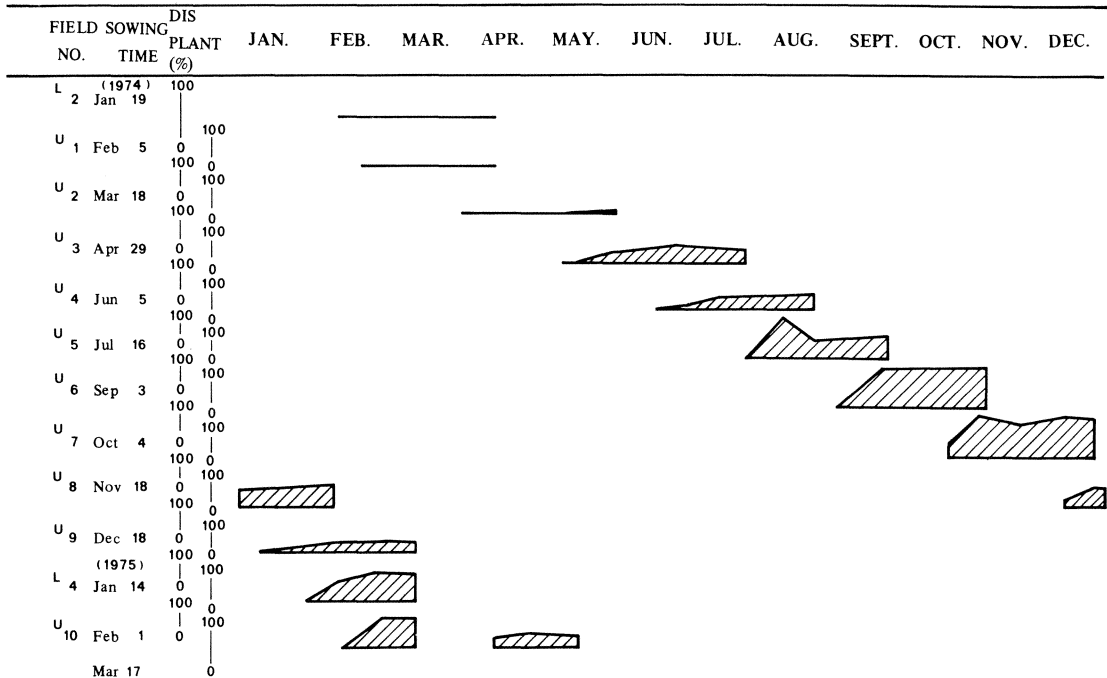


Fig. 1-1. Seasonal variation of the diseased maize plants (maize plot) infected by sorghum downy mildew at the Suphanburi Rice Experiment Station from 1974 to 1975. L: lowland, U: upland

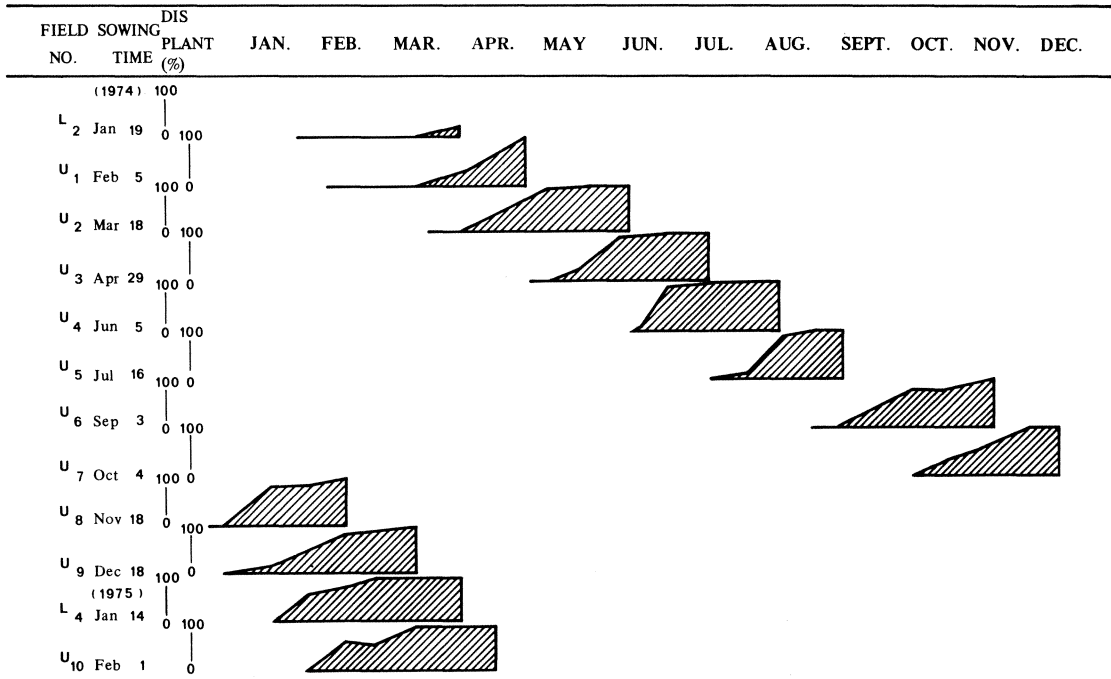


Fig. 1-2. Seasonal variation of the diseased soybean plants (soybean plot) infected by rust at the Suphanburi Rice Experiment Station from 1974 to 1975 L: lowland, U: upland