

 **CIAT**
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COLECCION HISTORICA


CENTRO DE DOCUMENTACION

A DESCRIPTION OF COMMON TROPICAL PASTURE DISEASES
AND OF EVALUATION METHODOLOGY

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TROPICAL PASTURES PROGRAM

CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL (CIAT)

APARTADO AEREO 6713, CALI, COLOMBIA

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PED. EXTERIOR



IDENTIFICATION AND EVALUATION OF TROPICAL PASTURE DISEASES

(La identificación et évaluation des maladies des
fourragées tropicaux)

A. INTRODUCTION

B. DISEASE IDENTIFICATION (Identification des maladies)

1. Stylosanthes diseases (Les maladies de Stylosanthes)

Discussion

2. Centrosema diseases (Les maladies de Centrosema)

Discussion

3. Desmodium diseases (Les maladies de Desmodium)

Discussion

4. Arachis diseases (Les maladies de Arachis)

Discussion

5. Flemingia diseases (Les maladies de Flemingia)

6. Leucaena diseases (Les maladies de Leucaena)

7. Pueraria diseases (Les maladies de Pueraria)
8. Zornia diseases (Les maladies de Zornia)
9. Aeschynomene diseases (Les maladies de Aeschynomene)

Discussion

10. Brachiaria diseases (Les maladies de Brachiaria)
11. Andropogon diseases (Les maladies de Andropogon)
12. Panicum diseases (Les maladies de Panicum)

Discussion

GENERAL REVISION (Revision Generale)

C. DISEASE EVALUATION (Evaluation des maladies)

AESCHYNOMENE

ANTHRACNOSE

Pathogen: Colletotrichum oloeosporioides
Host range: Aeschynomene spo.
Distribution: South America
Yield loss: Unknown
Symptoms:
Dark stem lesions. In severe attacks plant death.

ANDROPOGON

RUST

Pathogen: Unknown

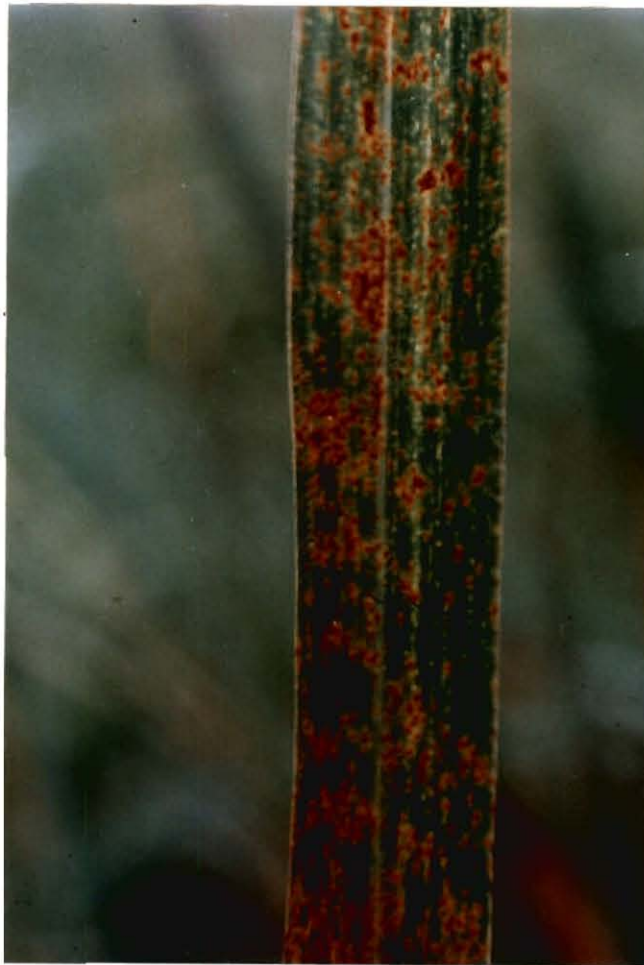
Host range: Andropogon gayanus

Distribution: South America

Symptoms:

Small orange lesions which later contain redish pustules with uredospores.

Severe attacks can cause leaf yellowing and death.



RHYNCHOSPORIUM

Pathogen: Rhynchosporium orizae
Host range: Arthropogon aavanus
Distribution: South America
Damage: Unknown

Symptoms:

Small red lesions with purple borders which later unite on the upper side of leaves. On lower side of leaves lesions are more an orange-red colour. Under favourable conditions can cause a leaf blight with zonation. Infections often limited more to apex end of leaves.



LEAF WILT

Pathogen: Unknown
Host range: Andropogon oaxanus
Distribution: Central and South America
Yield loss: Unknown

Symptoms:

Drying of leaves from apex to base. Sometimes small dark redish leaf spots associated with the problem. White lesions with red borders have been observed on stems.



DRECHSLERA LEAF SPOT

Pathogen: Drechslera sp.
Host Range: Andropogon gayanus
Distribution: South America
Damage: Unknown

Symptoms:

Small purple lesions with light red centres. From a far lesion appear brown.
Severe attacks can cause leaves to wilt.



ARACHIS

ANTHRACNOSE

Pathogen: Colletotrichum sp.

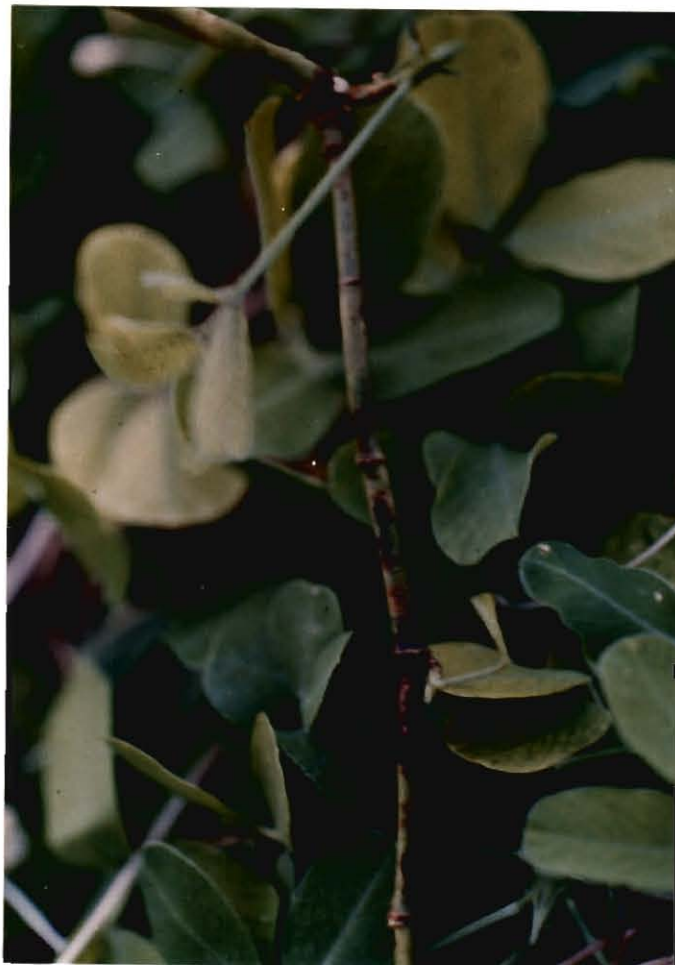
Host range: A. pinto and other Arachis spp.

Distribution: Central and South America

Damage: Unknown

Symptoms:

On stems and petioles, black lesions of various sizes occasionally with masses white to orange spores. Severe attacks may kill plants.



SPHACELOMA SCAB

Pathogen: Sphaceloma arachidis
Host range: A. pintoi and other Arachis spp.
Distribution: America
Damage: Unknown
Symptoms:

On leaves, initially show small chlorotic spots on the both sides of the leaf, often congregated close to the central vein and the leaf border. Later, the colour of the lesions changes to redish-brown. On stems and petioles the lesions are larger and irregular and develop raised borders and a sunken centre which appear like scabs. Affected plants appear burned.



PEPER SPOT AND LEPTOSPHAERULINA

Pathogen: Leptosphaerulina crassiasca
Host range: A. pintoii and many other species
Distribution: Wide spread
Damage: Unknown
Symptoms:

Peper spot appears like small black spots on leaves. Leptosphaerulina is characterized by apical lesions shaped like a V on leaves which may cause leaf blight. Mature lesions are often covered with tiny black spots which represent the fruiting bodies Leptosphaerulina.



RHIZOCTONIA FOLIAR BLIGHT

Pathogen: Rhizoctonia solani

Host range: Arachis glabris

Distribution: World wide

Damage: Unknown

Symptoms:

Aquatic lesions which darken when dry and which have darker borders. Often zones of various stages coalesce. Severe infections can cause defoliation and plant death.



RUST

Pathogen: Puccinia arachidis

Host range: Arachis spp.

Distribution: Word wide

Damage: Unknown

Symptoms:

Orange pustules, sometimes darker on underside of leaves. May cause leaf discolouration and defoliation.



VIRUSES

Pathogen: Peanut Mottle Virus (PeMV)

Host Range: Arachis spp.

Distribution: World wide

Damage: Unknown

Symptoms:

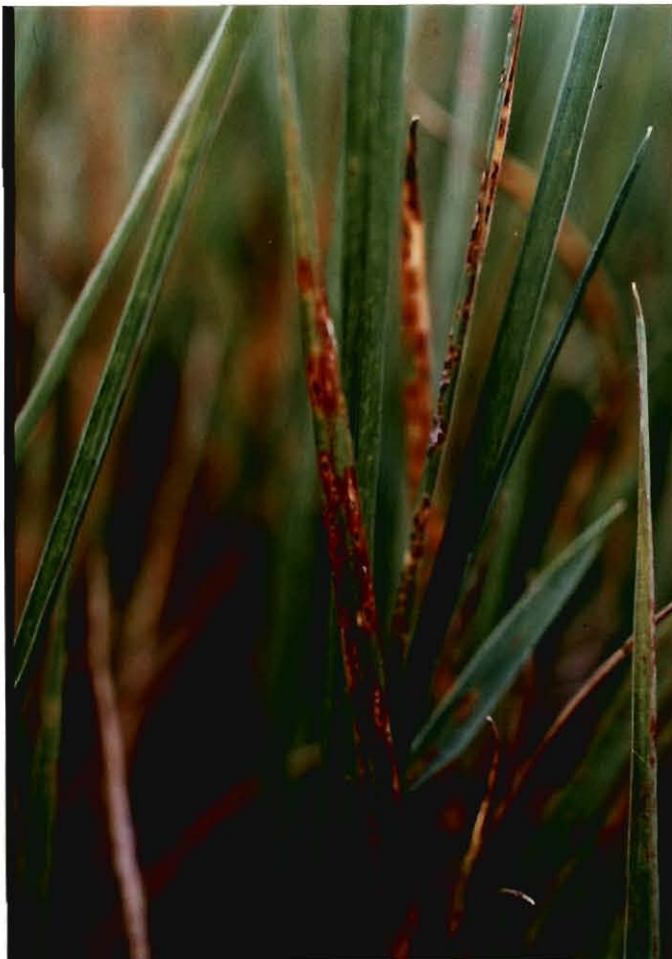
Mosaic of dark and light green regions on leaves, often with defoliation, or cupping appearance. Probably seed transmitted in A. pintoi.

BRACHIARIA

RUST

Pathogen: Uromyces setariae-italicae
Host range: Brachiaria spp. esp. B. humidicola
Distribution: Central and South America
Yield loss: Unknown
Symptoms:

At early stages, cream pustures form which contain red-brown uredospores of the fungus. Concurrently in many plants red anthocyanin is produced around infections. Later in many hosts lesions with necrotic areas and anthocvanin predominate on leaves.



RHIZOCTONIA BLIGHT

Pathogen: Rhizoctonia solani
Host range: Brachiaria spp. especially B. brizantha
Distribution: Central and South America
Yield loss: Unknown
Symptoms:
Large cream to white lesions on leaves. On stems eye lesions with dark border.
Can cause defoliation and plant death.



CENTROSEMA

RHIZOCTONIA FOLIAR BLIGHT

Pathogens: Rhizoctonia solani AG1 and AG4
Rhizoctonia sp. (binucleate)
Host range: Centrosema spp. especially C. brasilianum
Distribution: Latin America
Damage: 30-100% yield loss (dry weight)
Symptoms:
Cream lesions and leaf blight. Defoliation and death of plants severely affected. Disease often patchy.



CERCOSPORA LEAF SPOT

Pathogen: Cercospora centrosemae and Cercospora spp.

Host range: C. pubescens, C. macrocardum

Distribution: Latin America

Damage: Unknown

Symptoms:

On leaves, small circular to angular brown leaf spots with a black centre and often with a halo.



BACTERIOSIS

Pathogen: Pseudomonas fluorescens Biotvpe II

Host range: Centrosema spp.

Distribution: Latin America

Damage: 38-47% yield loss

Symptoms:

Terminal death, on leaves necrotic lesions, leaf deformation and blight. Stunting of plant growth in severe cases. Infection of pods and seed. On pods lesions have a oily appearance.



BACTERIOSIS (Cont'd)



CYLINDROCLADIUM BLIGHT

Pathogen: Cylindrocladium colhounii

Host range: Centrosema spp.

Distribution: Latin America

Damage: Initial tests 30% yield loss

Symptoms:

On leaves, small lesions which coalesce and which in most species form concentric rings. Blight of leaves and defoliation.



ANTHRACNOSE

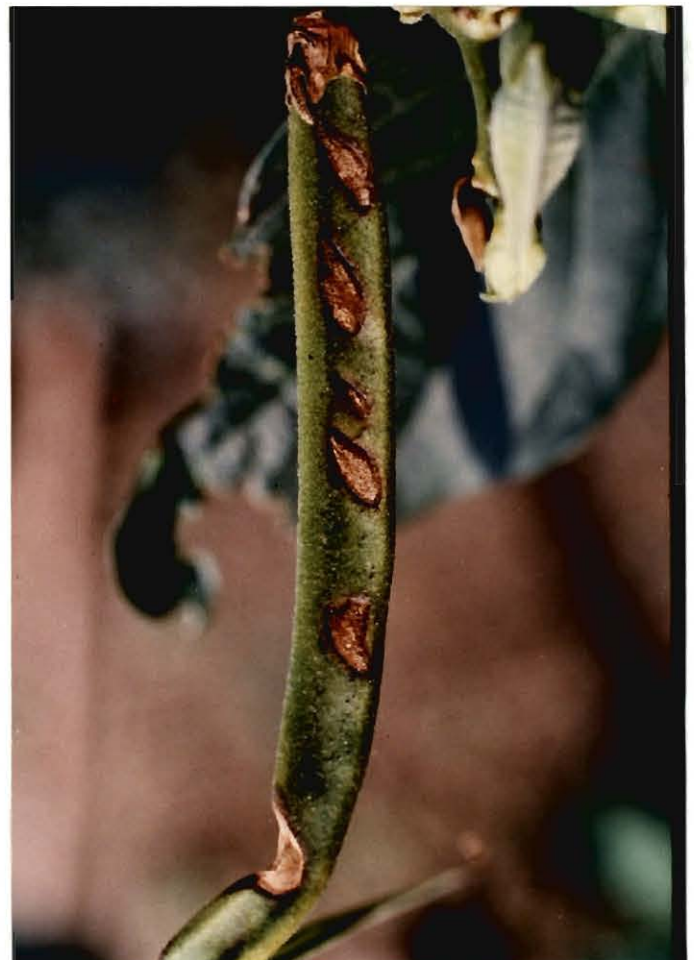
Pathogen: Colletotrichum gloeosporioides
Host range: Centrosema spp. esp. C. macrocarpum and C. acutifolium

Distribution: Latin America, but pathogen world wide

Symptoms:

C. macrocarpum: on leaves necrotic lesions starting as spots especially on borders. Sometimes necrotic lesions are found on veins. Later consequences of infection are defoliation and in extreme cases plant death. On pods, round to irregular light coloured sunken lesions and infection of seed.

C. acutifolium: terminal death, on young leaves necrosis often associated with infections of veins. On pods sunken light colours round to irregular lesions in which often masses of white to orange spores can be detected. Seed transmitted.



VIRUSES

Pathogen: Soy Bean Mosaic Virus (SMV)

Host range: Centrosema spp.

Distribution: World wide

Symptoms:

Mottle of dark and light green on leaves and deformation. Symptoms are more prominent on younger leaves. Seed transmitted.

LITTLE LEAF MYCOPLASMA

Pathogen: Mycoplasma sp.

Host range: Centrosema spp.

Distribution: Central and South America

Damage: Unknown

Symptoms:

Proliferation of small leaves and stems with short internodes. Not transmitted by seed.



WILT SYNDROME (or FACTOR X)

Pathogen: Unknown
Host range: C. acutifolium Vichada
Distribution: Colombia
Symptoms:

Sudden collapse of adult plant particularly those on tralices and in relatively heavy soils. Most apparent during seed production phase during the 1st or 2nd year. Usually a problem of seed multiplication plots.



DESMODIUM

ROOT-KNOT NEMATODE

Pathogen: Meloidogyne javanica, M. arenaria and other
Meloidogyne spp.

Host range: Desmodium spp., especially D. ovalifolium, D.
heterocarpum and D. gyroides

Distribution: Colombia, Brazil, Costa Rica

Symptoms:

Initially chlorosis of plants and later, in severe cases, defoliation and plant death. Roots contain galls, which unlike nodules are not easily detached.



LITTLE LEAF MYCOPLASMA

Pathogen: Mycoplasma sp.
Host range: Desmodium spp. (Wide host range)
Distribution: Latin America
Symptoms:
Proliferation of leaves, stems, small leaves and small internodal distances.
Not seed transmitted.

FALSE RUST

Pathogen: Synchytrium desmodii
Host range: D. ovalifolium
Distribution: Asia, Colombia
Damage: 18-70% yield loss
Symptoms:
On leaves brown to orange coloured pustules. Deformation of the leaf apices and young leaves. On stems the lesions form galls. In severe cases plants defoliate and stems die.



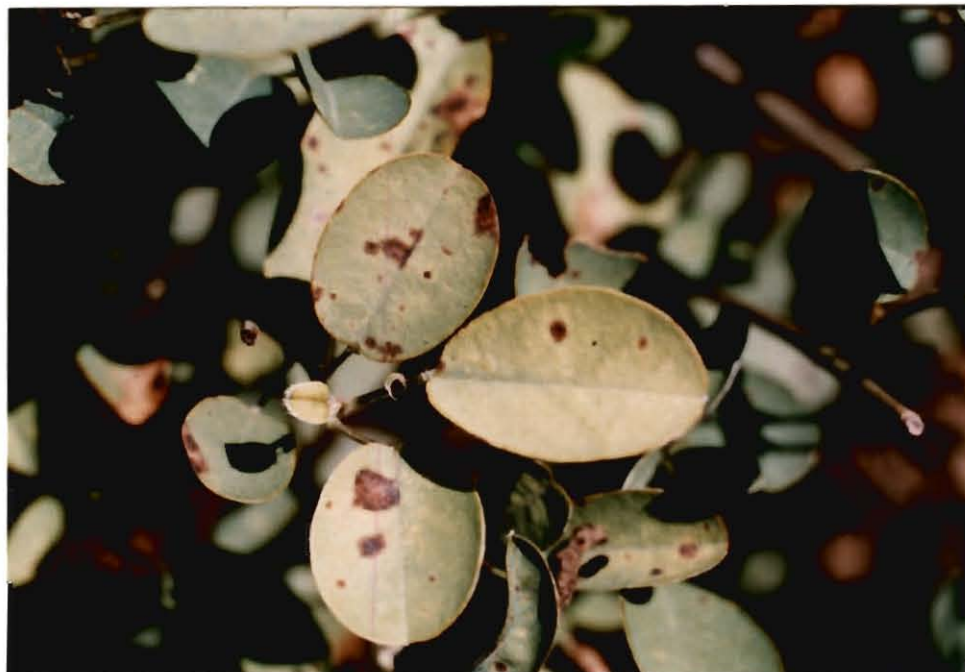
POWDERY MILDEW

Pathogen: Didium sp.
Host range: Desmodium spp.
Distribution: Latin America
Symptoms:

Powdery white appearance on the upper surface of leaves. Severe cases defoliation.

CERCOSPORA LEAF SPOT

Pathogen: Cercospora spp.
Host range: Desmodium spp.
Distribution: Latin America
Symptoms:
On leaves irregular dark-brown lesions

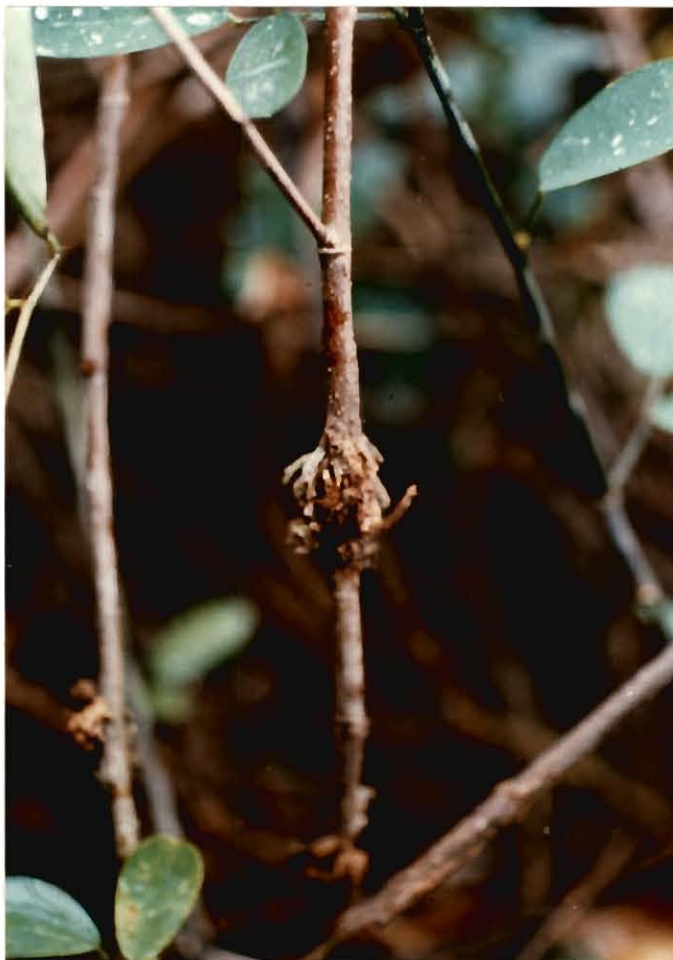


RHIZOCTONIA FOLIAR BLIGHT

Pathogen: Rhizoctonia solani
Host range: Desmodium spp.
Distribution: Latin America
Symptoms:
Light redish brown, irregular lesions on leaves.

STEM GALL NEMATODE

Pathogen: Pterotylenchus cecidogenus
Host range: Desmodium spp.
Distribution: Colombia
Symptoms:
Chlorosis of leaves and stem galls around nodes. In severe cases death of plants.



FLEMINGIA

ANTHRACNOSE

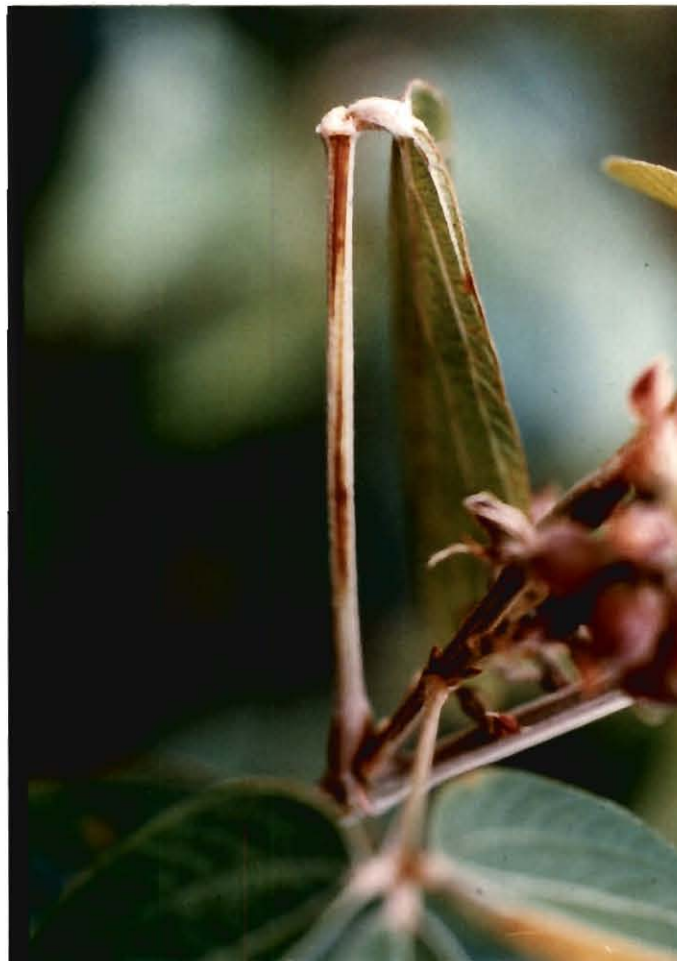
Pathogen: Colletotrichum spp.

Host range: Flemingia spp.

Distribution: Colombia

Symptoms:

Redish lesions on petioles and stems which later change to a darker colour. Abscission of leaves, die-back and in severe cases plant death. Probably seed transmitted.



LEUCAENA

CAMPTOMERIS LEAF SPOT

Pathogen: Camptomeris leucaenae

Host range: Leucaena spp.

Distribution: Central and South America, India, Taiwan,
Philippines

Yield loss: Unknown

Symptoms:

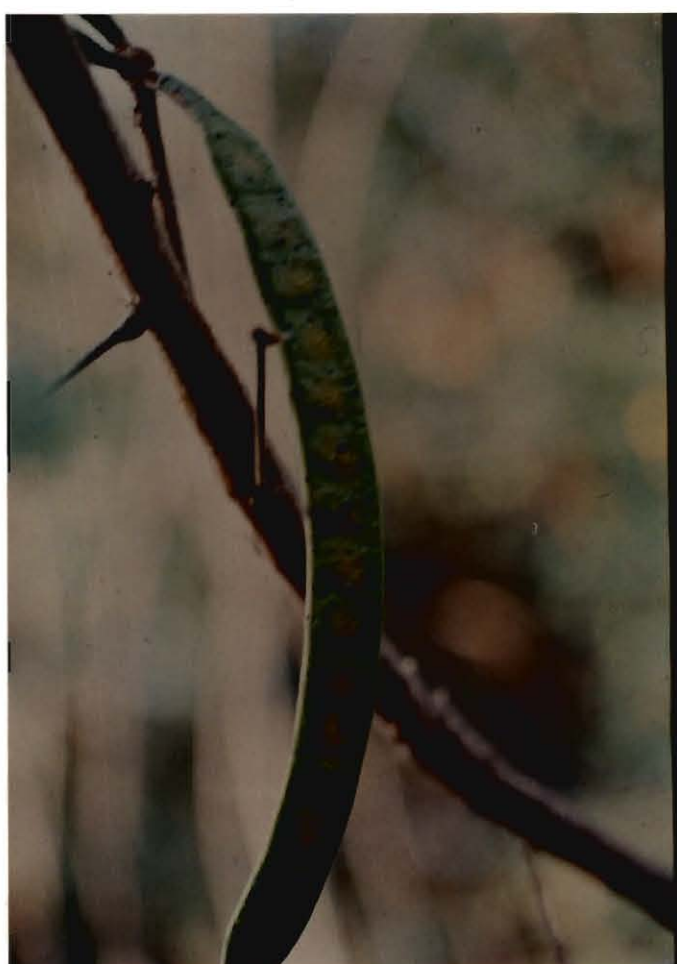
Chlorotic patches 1-5 mm in diameter, commonly with necrotic centres, on the upper surface of leaflets, and profuse sporulation in black pustules on lower surface. Coalescence of lesions results in chlorotic, abscission of leaflets and defoliation.



ANTHRACNOSE

Pathogens: Colletotrichum gloeosporioides and
Colletotrichum sp.
Host range: Leucaena spp.
Distribution: World wide
Yield Loss: Unknown
Symptoms:

C. gloeosporioides causes small black spots on leaves and petioles and severe pod rot with small spots 5-10 mm spots wilt at turns slightly sunken centres. Colletotrichum sp. caused black spot, foliar chlorosis and defoliation. Seed transmission.



BACTERIAL POD ROT

Pathogen: Pseudomonas fluorescens
Host range: Leucaena spp.
Distribution: Central and South America
Yield loss: Unknown
Symptoms:

Initiation with water-soaked lesions around insect feeding holes on green pods in seed filling stage. Lesions expand and become necrotic. Seeds begin to rot. Under humid conditions, pods rot rapidly and bacteria ooze from insect feeding holes. Severely rotted pods fall and seed production is greatly reduced. Seed transmitted.

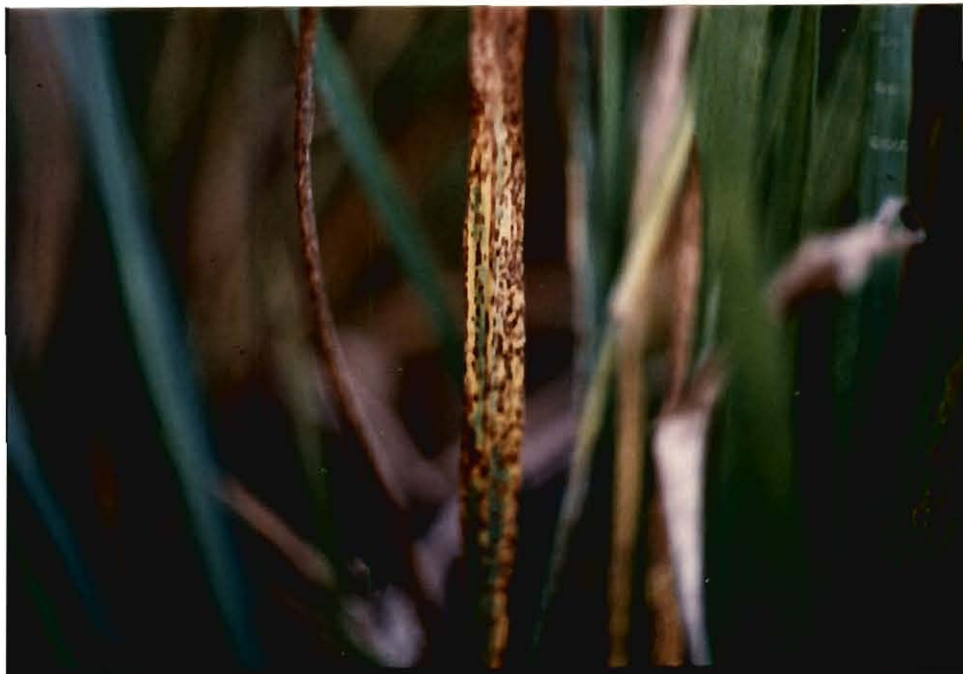


PANICUM

CERCOSPORA LEAF SPOT

Pathogen: Cercospora sp.
Host range: Panicum maximum
Distribution: Central and South America
Yield loss: Unknown
Symptoms:

Small elliptical spots with dark borders and light centres on leaves and stems. From a distance the spots take on a brownish appearance. Severe infections can cause leaf blight and leaf wilt.



RUST

Pathogen: Unknown
Host range: Panicum maximum
Distribution: South America
Yield loss: Unknown

Symptoms:

Reddish and orange lesions over leaves. Pustules not clearly visible. Can cause leaf death.



SMUT

Pathogen: Tilletia ayresii
Host range: Panicum maximum
Distribution: Africa and South America
Symptoms:

Smut affects the inflorescence. The flowers are filled with spores instead of seed. Spores are dark. The fungus is transmitted through seed.



PUERARIA

ANTHRACNOSE

Pathogen: Colletotrichum spp.

Host range: Pueraria spp.

Distribution: Central and South America

Yield loss: Unknown

Symptoms:

On leaves, symptoms start with dark lesions which often attack veins and leaf blight may develop. On petioles and stems dark lesions form. On pods, sunken round lesions often occur. Seed transmission.



CERCOSPORA LEAF SPOT

Pathogen: Cercospora sp.

Host range: Pueraria spp.

Distribution: Central and South America

Yield loss: Unknown

Symptoms:

Symptoms appear on leaves as grey often rounded spots which increase in size. On close examination with loop brown reveal hairlike structures of the fungus.



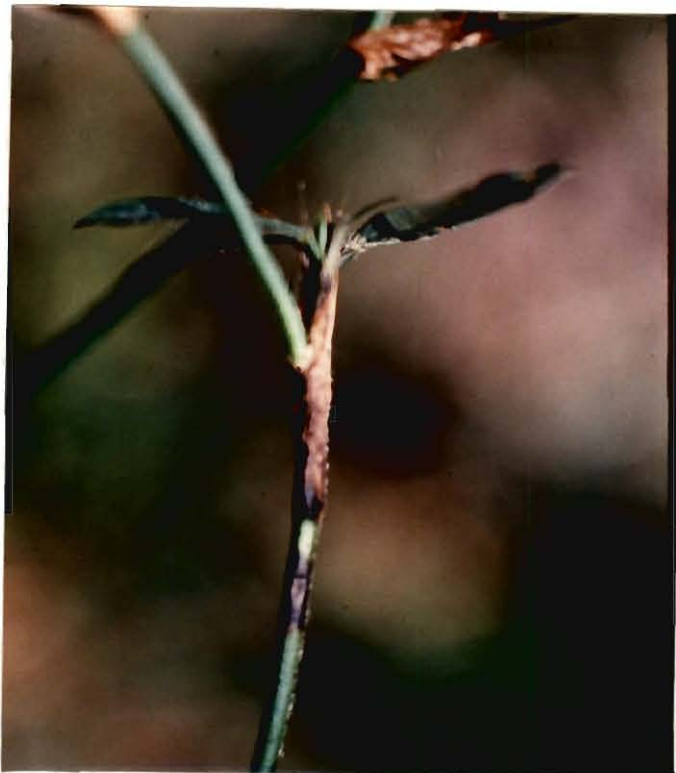
STYLOSANTHES SPP.

ANTHRACNOSE

Pathogens: Colletotrichum gloeosporioides
Colletotrichum dematium
Host range: All Stylosanthes spp.
Distribution: World wide where Stylosanthes is grown.
Damage: 50-100% yield loss.
Symptoms:

In S. guianensis and S. capitata: On leaves, round to irregular brown-black lesions which can cause necrosis of the leaf apices and margins. Severe infection often causes defoliation. On stems, petioles and stipules, larger black lesions often occur which in severe cases cut the vascular system and cause die-back symptoms and finally plant death.

In S. scabra, S. hamata, S. humilis and S. viscosa: On leaves lesions have light-center with dark borders which often contain small black points, the sexual fruiting structures perithecia of the fungus. The pathogen is seed transmitted.



SCLEROTIUM WILT

Pathogen: Sclerotium rolfsii (= Corticium rolfsii)

Host range: Stylosanthes spp. (esp. S. capitata)

Distribution: Pathogen: world wide

Symptoms:

Wilting of plants lower portions of affected plants often contain white mycelium and small brown round structures called sclerotia.



CERCOSPORA LEAF SPOT

Pathogen: Cercospora sp.
Host range: S. guianensis
Distribution: Latin America, esp. humid tropics and Costa Rica
Symptoms:
Small, round-brown to black leaf lesions. No stem lesions.

LITTLE LEAF MYCOPLASMA

Pathogen: Mycoplasma sp.
Host range: S. capitata, S. macrocephala, S. scabra, S. guianensis
Distribution: Australia, Latin America
Symptoms:
Proliferation of small leaves and, small internodal distances. Is not seed transmitted.

NECOSMOSPORA WILT

Pathogen: Neocosmospora vasinfecta

Host range: Stylosanthes spp.

Distribution: Colombia and Brazil

Damage: Up to 100% of susceptible plants killed

Symptoms:

First leaves become chlorotic, followed by a wilt, decoloration of stems from the base upwards and decoloration of the pith of stems.



VIRUSES

Pathogen: Peanut Mottle Virus (PeMV)

Host range: Many species

Distribution: World wide

Symptoms:

Mosaic pattern of dark and light shaded areas on leaves. Probably seed transmitted.



DRECHSLERA LEAF SPOT

Pathogen: Drechslera sp.

Host range: Zornia spp.

Distribution: South America

Yield loss: Unknown

Symptoms:

On leaves 1-3 mm brown to black spots. Affected leaves become chlorotic and defoliate.



BACTERIAL WILT

Pathogen: Corvnebacterium flaccumfaciens

Host range: Zornia spp.

Distribution: South America

Yield loss: Unknown

Symptoms:

Initially affected plants become chlorotic and some branches wilt. Later the whole plant wilts. In stem and roots vascular bundler have brown appearance.



ANTHRACNOSE

Pathogen: Colletotrichum gloeosporioides

Host range: Zornia spp.

Distribution: South America

Yield loss: Unknown

Symptoms:

On leaves 1-5 mm brown to black lesions. Severe infection cause defoliation.
Probably seed transmitted.



EVALUATION OF TROPICAL PASTURE DISEASES

(Evaluation des maladies des fourrages tropicaux)

1. SEVERITY (Sévérité)
2. INCIDENCE (Incidence)
3. GROWTH STAGE (Stade de croissance)

1. SEVERITY (Sévérité)

- a) FOLIAR DISEASES CAUSED BY FUNGI AND
BACTERIA

(Les maladies foliaires par champignons
et bactéries)

- b) ROOT DISEASES, VIRUSES AND MYCOPLASMAS

(Les maladies des racines, virus et
mycoplasmas)

- a) FOLIAR DISEASES CAUSED BY FUNGI AND BACTERIA
 (Les maladies foliaires par Champignons et
 Bacteries)

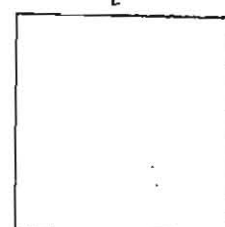
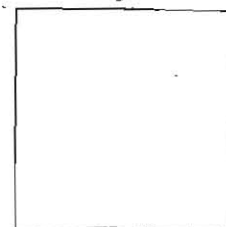
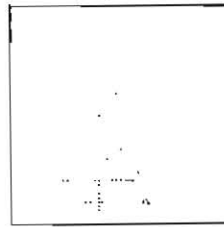
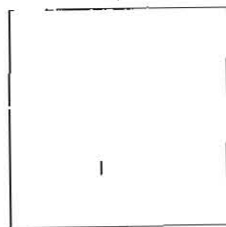
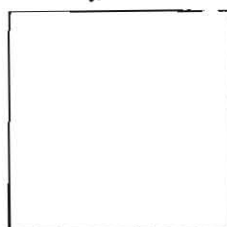
SEVERITY (Sévérité)

0% SURFACE AREA AFFECTED (Superficie affectée)

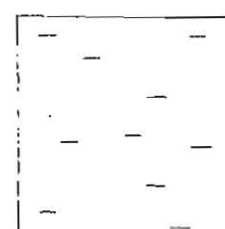
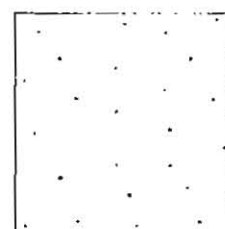
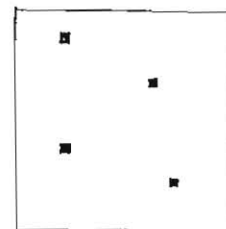
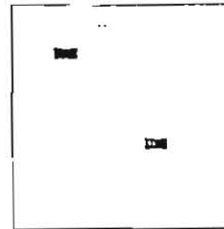
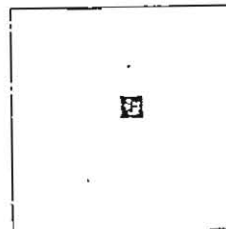
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Area afectada

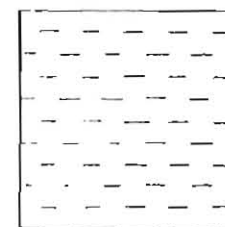
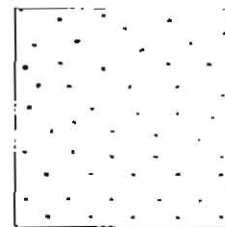
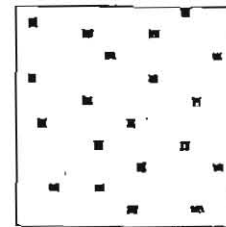
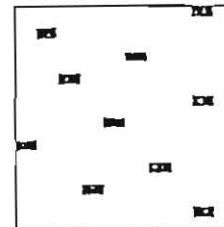
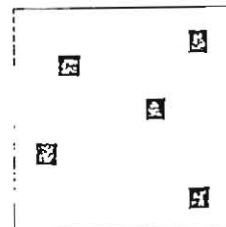
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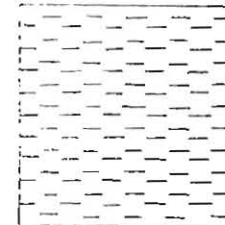
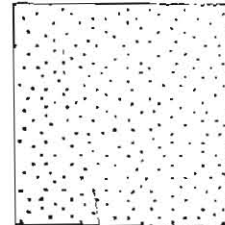
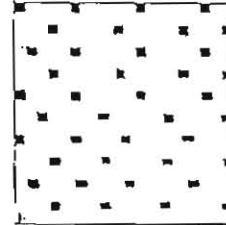
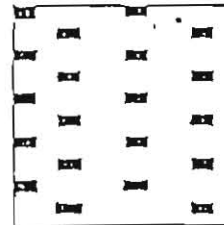
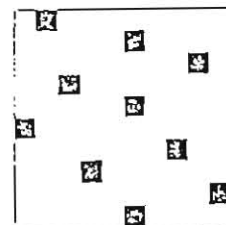
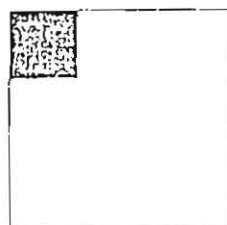
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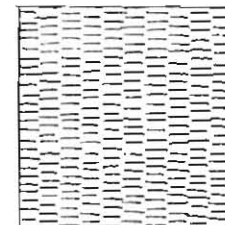
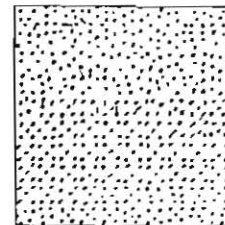
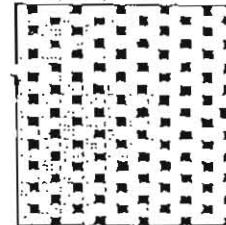
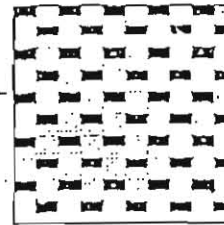
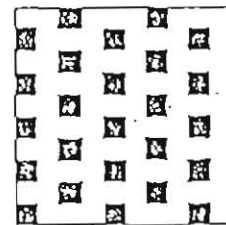
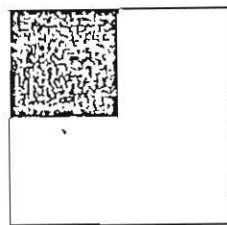
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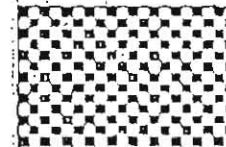
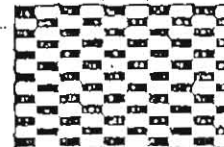
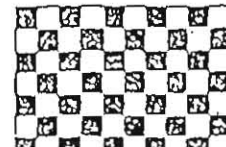
10%



25%

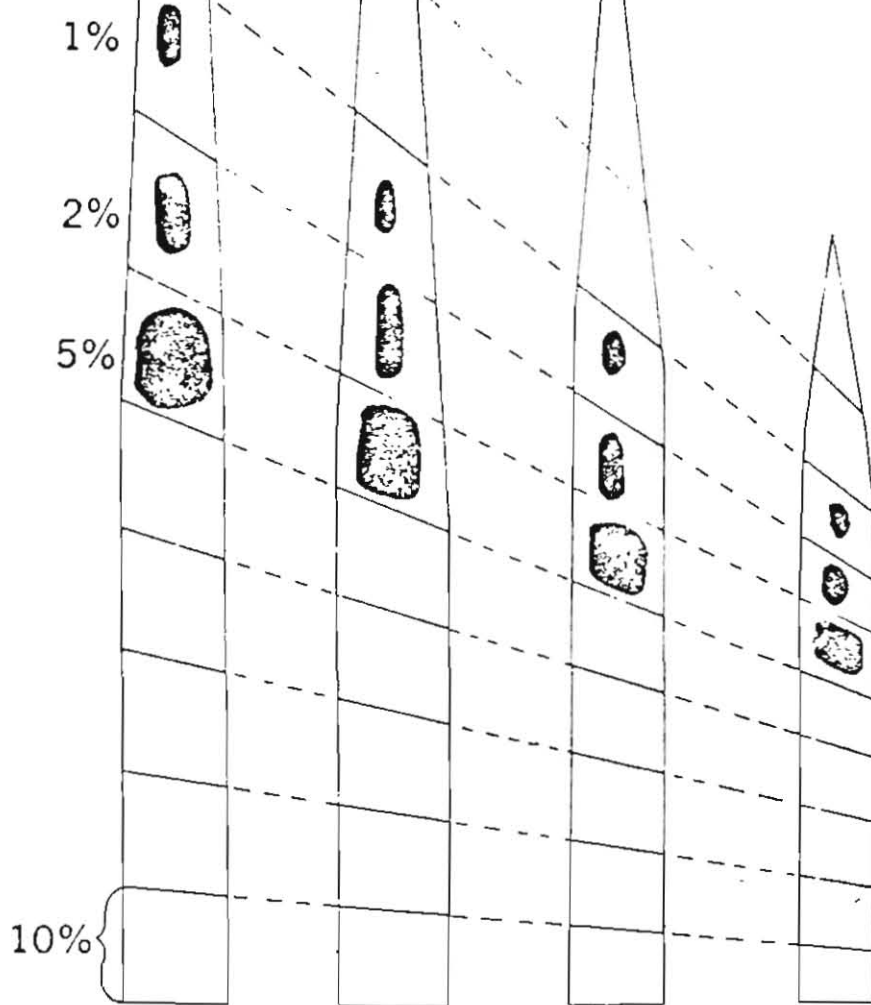


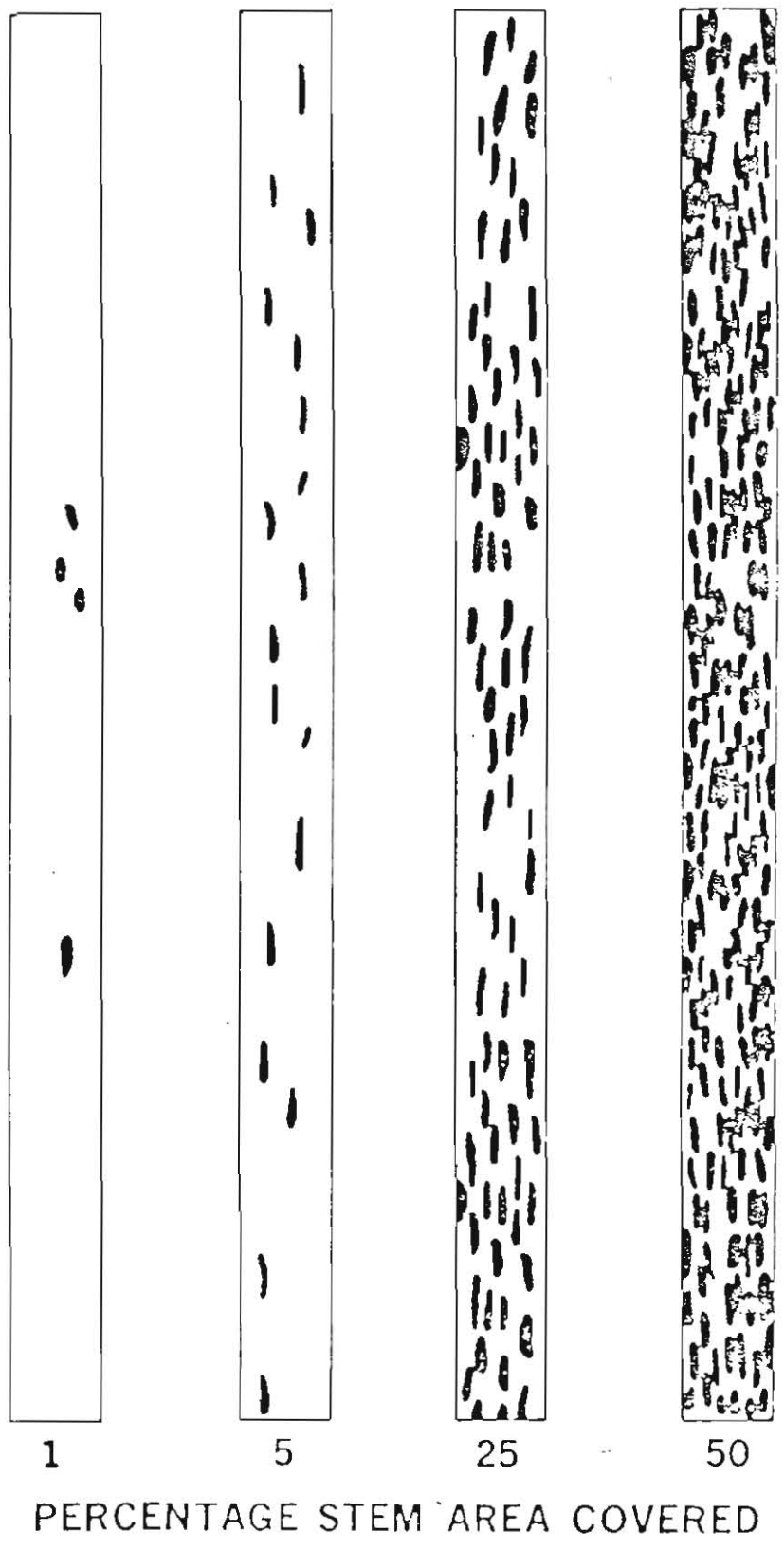
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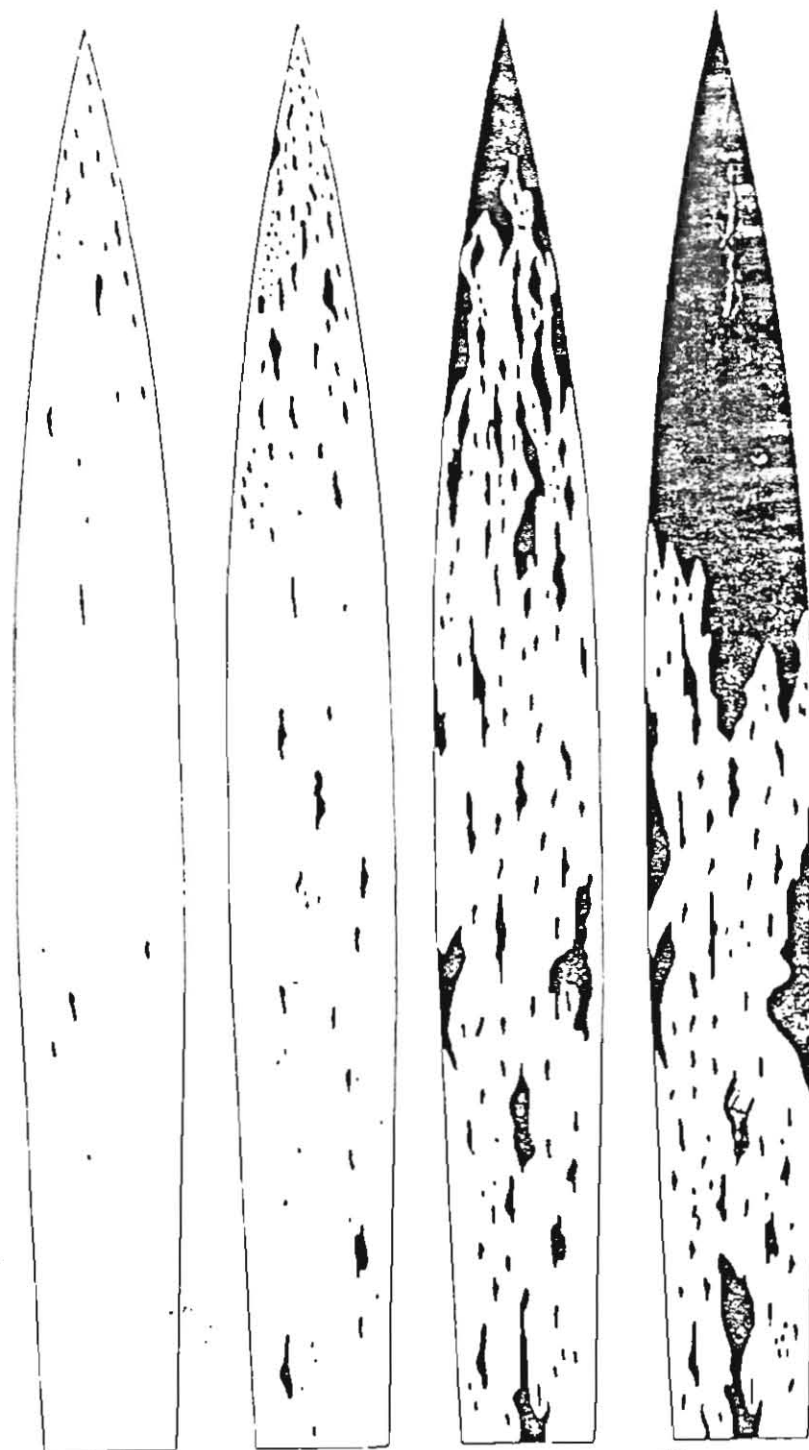


10% { EACH DIVISION REPRESENTS
10% OF THE AREA OF EACH LEAF

THE BLACK AREAS REPRESENT
1, 2, & 5% OF EACH LEAF







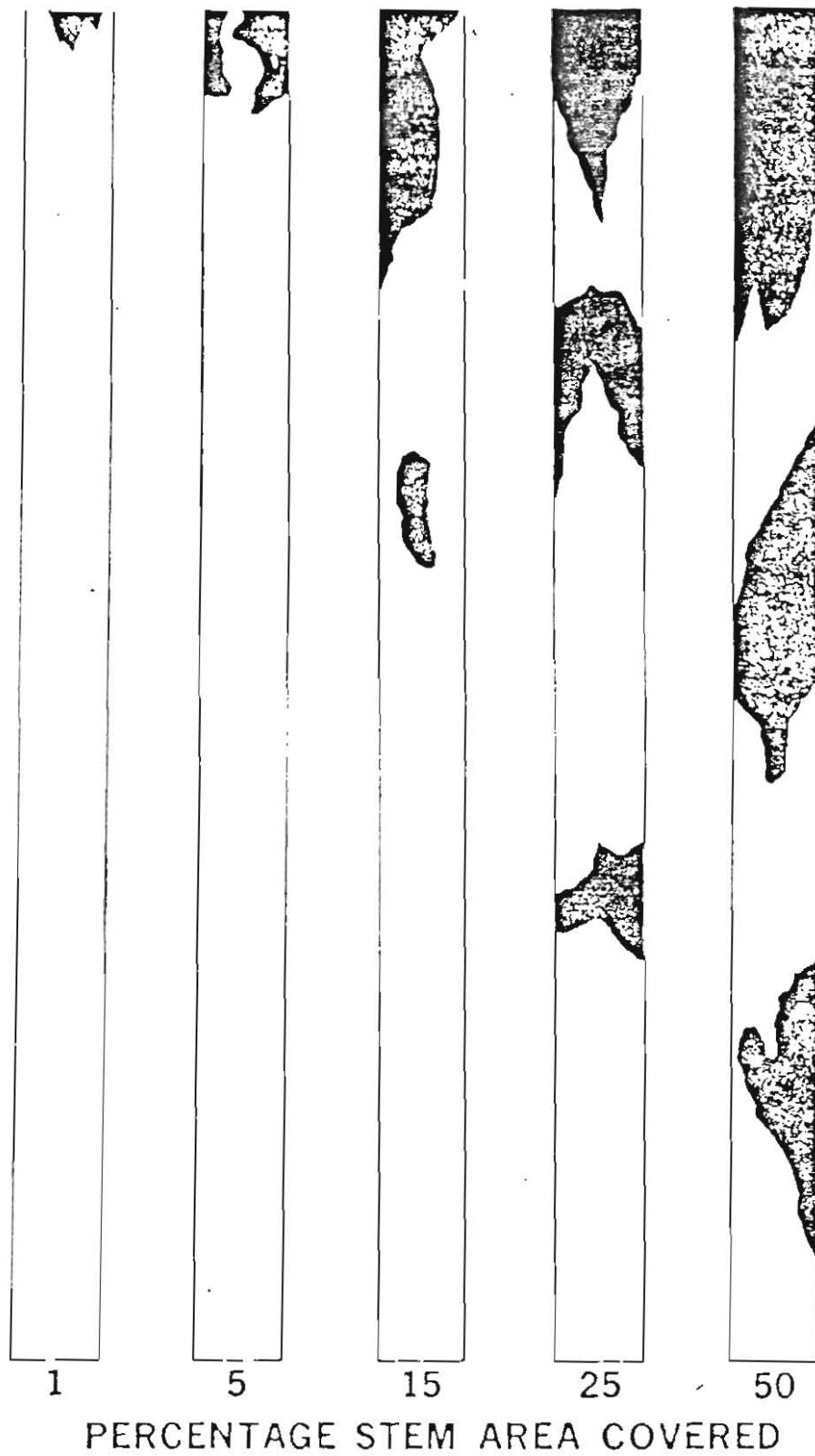
1

5

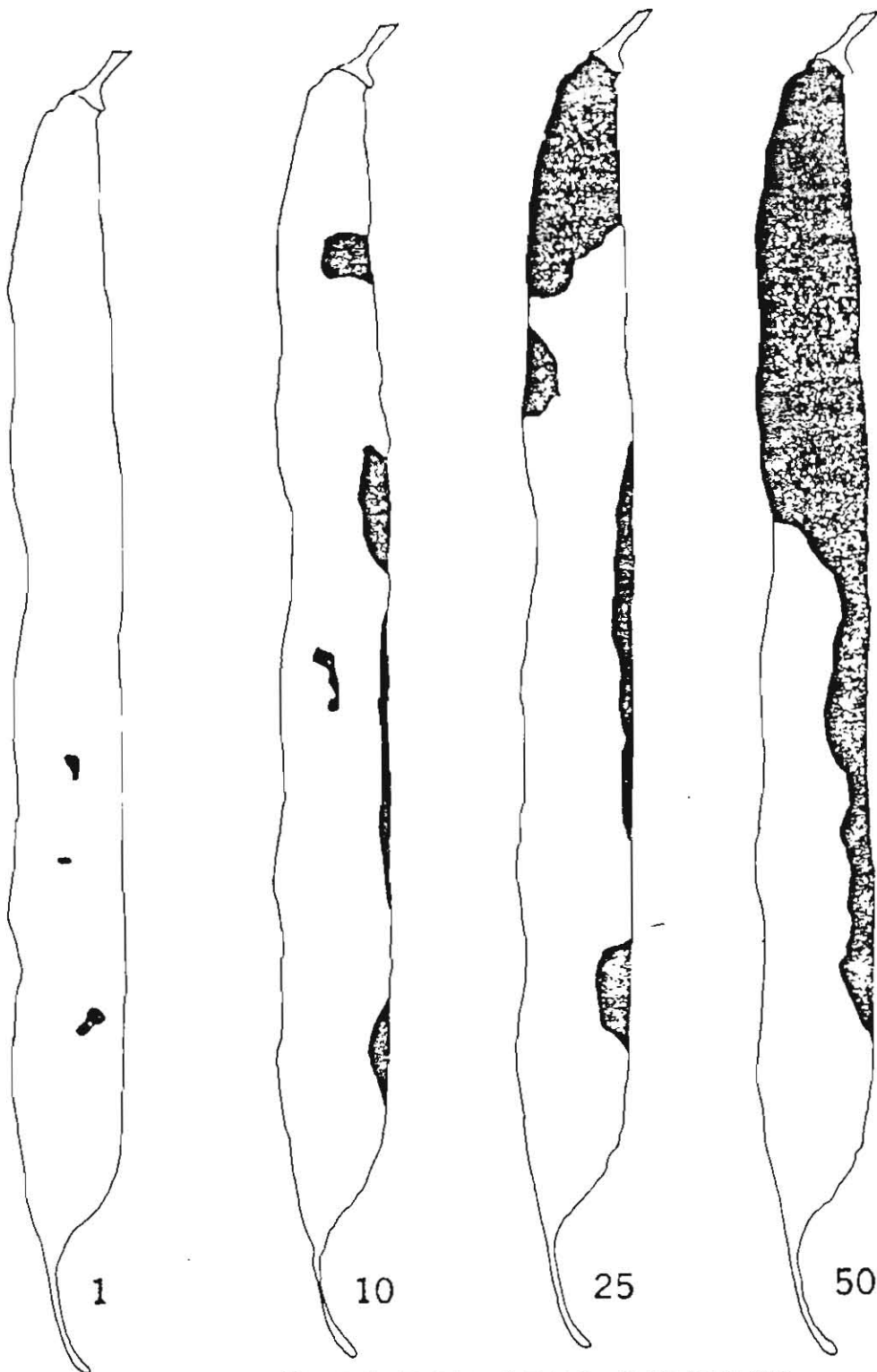
25

50

PERCENTAGE LEAF AREA COVERED



BACTERIAL BLIGHT
(Pod symptoms)



PERCENTAGE POD AREA COVERED

b) ROOT DISEASES, VIRUSES AND MYCOPLASMAS

(Les Maladies des Racines, Virales et par Mycoplasmes)

SEVERITY (Sévérité)

1 = NO SYMPTOMS (Pas des symptômes)

3 = MILD (Légère)

5 = MODERATE (Moyenne)

7 = SEVERE (Sévère)

9 = VERY SEVERE OR MORE THAN 50% OF PLANTS

DEAD (Très sévère, ou plus de 50% de plantes
mortes)

2. INCIDENCE

% OF PLANTS INFECTED

(% des plantes infectées)

0

1

5

10

25

50

100

3) GROWTH STAGE (Stade de la croissance)

50% OR MORE OF PLANTS (50% des plantes ou plus)

	0 = NON GERMINATED SEED (Prégermination)
	1 = GERMINATION (Germination)
	2 = EMERGENCE (Emergence)
	3 = COTYLEDONARY LEAVES (Feuilles cotylédonaire)
1st.	4 = PRIMARY LEAVES (Premières feuilles)
cycle	5 = FOURTH LEAF (Quatre feuilles)
(1ere	6 = PREFLOWERING (Préfloraison)
cicle)	7 = FLOWERING (Floraison)
	8 = SEED PRODUCTION (Production des semences)
	9 = MATURE SEED (Semences à maturité)
2nd	10 = POST-SEED MATURITY PHASE (Phase post-maturité
cycle	des semences)
(2eme	11 = PREFLOWERING (Préfloraison)
cicle)	12 = FLOWERING (Floraison)
	13 = SEED PRODUCTION (Production de semences)
	14 = SEED MATURITY (Semences à maturité)

HOW TO PRESENT THE GROWTH STAGES

(Comment présenter les stades de croissance)

FIRST CYCLE (Premier cycle) = 0 - 9

THERE AFTER (Après)	=	STAGE	YEAR	SEED
		(Stade)	(Année)	CYCLE IN
				YEAR
				(Cicle des
				semences
				cette année)

e.g. (p.ex.)		10	2	1
	=	$10^{2(1)}$		

47	Trips-Acaros	Thrips & Acarides (mites)	Daño por Insectos
48	Pulguilla-Homop.	Pucerons (Aphids)	
49	Comedores	chrysomelids and grass	
50	Hemipteros	Sauteurs (leaf + plant hoppers)	
51	Salivazo	Spittle bugs	
52	Barrenador	Stem borers	
53	Perforad.boton.		Daño por enfermedades
54	Otro		
55	Otro		
57	Negra	%	
58	Marrón	%	
59	Naranja	%	
60	Crema	%	
61	Marrón polv.	%	
62	Naranja polv.	%	
63	Negra	%	
64	Marrón	%	
65	Chancro	%	
66	Marchitez-muerte	%	
67	Clorosis-muerte	%	
68	Inflorescencia pegaj.	%	
69	Inflorescencia gris pegaj.	%	

Fecha de siembra día ; mes a. 10 año -12

Fecha de evaluación día: mes año

DATOS No considere decimales

[illegible]

País _____

Localidad _____

Institución _____

Colaborador(es) _____

Fecha de siembra: día mes año Fecha de evaluación: día mes año

DATOS No considere decimales

Mediciones de altura de plantas (cm)

Daños por insectos

Daño por enfermedades

Muestreo de base					Muestreo final			Otro	
S1	S2	S3	S4	S5	S1	S2	S3		

FIELD CODING FOR DISEASE
(Codefication des maladies)

<u>No.</u>	<u>Disease</u>	<u>Maladie</u>
1	Anthracnose	L'anthracnose
2	<u>Neocosmospora</u> wilt	Assèchement par <u>Neocosmospora</u>
3	<u>Sclerotium</u> wilt	Flétrissement par <u>Sclerotium</u>
4	<u>Botryosphaeria</u> canker	Cancre par <u>Botryosphaeria</u>
5	<u>Cercospora</u> leaf spot	Les taches foliaires par <u>Cercospora</u>
6	Little leaf mycoplasma	"Petite feuille" par <u>Mycoplasma</u>
7	<u>Synchytrium</u> false rust	La fause rouille par <u>Synchytrium</u>
8	Powdery mildew	Mildiou
9	Bacteriosis	Le bactériose
10	<u>Rhizoctonia</u> foliar blight	Pourriture foliaire par <u>Rhizoctonia</u>
11	<u>Cylindrocladium</u> foliar blight	La pourriture foliaire par <u>Cylindrocladium</u>
12	<u>Meloidogyne</u> root knot	<u>Meloidogyne</u>
13	Viruses	Les virus
14	Sphaceloma scab	La croûte par <u>Sphaceloma</u>
15	Peper spot and <u>Leptosphaerulina</u>	Les taches de poivrée et <u>Leptosphaerulina</u>
16	Rust	La rouille
17	<u>Camptomeris</u> leaf spot	Les taches foliaires par <u>Camptomeris</u>
18	<u>Drechslera</u> leaf spot	Les taches noires par <u>Drechslera</u>
19	<u>Rhynchosporium</u>	<u>Rhynchosporium</u>
20	Leaf blight	L'assèchement foliaire
21	Smut	Le Charbon
22	Bacterial wilt	Flétrissement par <u>Corynebacterium</u>
23	Stem gall nematode	Galles de la tige par nematode