

INTEGRATED PEST MANAGEMENT (IPM) OF SOYBEAN

Harun Murithi, Abubakar Kijoji & Fen Beed



©International Institute of Tropical Agriculture (IITA) ,2014

Ibadan Nigeria

International Address:

IITA, Carolyn House,

26 Dingwall Road,

Croydon CR9 3ee, UK

Headquarter in Nigeria

PMB 5320, Oyo Road

Ibadan, Oyo State, Nigeria

ISBN : 978-978-8444-04-6

Correction citation: Murithi Harun, Fen Beed and Abubakari Kijoji. 2014. Intergrated Pest Management (IPM) of Soybean .ITA, Ibadan, Nigeria

Table of Contents

Figures	3
Preface.....	4
Acknowledgement	6
INTRODUCTION	7
PEST AND DISEASE SCOUTING	8
Weed Scouting	8
Scouting insect pests	9
BACTERIAL DISEASES	10
Bacterial blight (<i>Pseudomonas savastanoi</i> pv <i>glycinea</i>)	10
Bacterial pustule (<i>Xanthomonas axonopoidis</i> pv <i>glycines</i>)	11
FUNGAL DISEASES	11
Downy mildew (<i>Peronospora manshurica</i>)	11
Anthracnose (<i>Colletotricum truncatum</i>)	12
Cercospora leaf blight (<i>Cercospora kikuchii</i>).....	12
Phomopsis seed decay (<i>Phomopsis longicolla</i>).....	13
Target leaf spot (<i>Corynespora cassicola</i>).....	14
Frogeye leaf spot (<i>Cercospora sojina</i>)	14
Red leaf blotch (<i>Phoma glycinicola</i>)	15
Asian Soybean rust (<i>Phakopsora pachyrhizi</i>).....	16
Septoria/ Brown leaf spot (<i>Septoria glycines</i>)	17
Pod and Stem Blight (<i>Diaporthe phaseolorum</i> var. <i>sojae</i>).....	17
Phytophthora blight (<i>Phytophthora sojae</i>).....	18
Charcoal rot (<i>Macrophomina phaseolina</i>).....	19
Fusarium root rot (<i>Fusarium solani</i> / <i>F. oxysporum</i>).....	20
VIRAL DISEASES	21
Soybean Mosaic Virus (SMV).....	21
Bean yellow mosaic virus (BYMV)	22
INSECT PESTS OF SOYBEAN	23
Root-knot nematodes (<i>Meloidogyne</i> spp.)	23
Stink-bugs	23
Leaf-feeding caterpillars	24
Pod borers (<i>Maruca vitrata</i>)	25
Soybean leaf miner (<i>Odontota horni</i>).....	25
Soybean aphid (<i>Aphis glycines</i>).....	25
Reference and Further Reading	27

Figures

1. Water soaked halos on leaves.....	10
2. Pale and light green lesions.....	11
3. Pale white to yellow spots on leaves.....	11
4. Sunken black lesions on stem.....	12
5. Dark purple specks on seeds.....	13
6. Dark reddish-purple bronzing on leaves.....	13
7. Pale white and chalky seeds.....	13
8. Reddish brown lesions.....	14
9. Irregular dark spots with water soaked appearance.....	15
10. Dark red angular spots along with primary veins.....	15
11. Soybean rust spores on the leaf surface.....	16
12. Dark brown spots and yellowing of leaf.....	17
13. Black fruiting bodies on stem and pod.....	17
14. Wilting plant.....	18
15. Stem rot.....	18
16. Brown discoloration on the stem.....	18
17. Outer and inner stem symptoms.....	19
18. Dumping off and root rot on soybean.....	20
19. Mottled seeds.....	21
20. Mosaic of light and dark green areas.....	21
21. Mosaic and yellowing.....	22
22. Galls on roots of soybean.....	23
23. Black stink bug.....	23
24. Green stink bug.....	23
25. Caterpillar feeding.....	24
26. Pod borer.....	25
27. Adult soybean leaf miner.....	25
28. Aphids feeding.....	26

Preface

Soybean production in Tanzania has increased over the recent past driven by an increased demand for soymilk, soyflour, and soyoil for human consumption and soybean for the feed industry, mainly poultry. Soybean is grown from 200-2000 meters above sea level. In Tanzania the crop is mainly grown in Southern highlands: Mbeya, Iringa, Rukwa, Ruvuma and in Morogoro in Eastern zone, Arusha and Kilimanjaro regions in Northern zone. Soybean is an important legume grown for its high protein (about 40%) and oil (about 20%) content. It plays a major role at household level as a source of income and in reducing malnutrition. It's mainly cultivated by small-scale farmers although interest in soybean production has increased among large-scale producers. An increase in the area under production is expected to increase the incidence and severity of soybean diseases and insect pests. Early and accurate diagnosis of diseases and pests is vital for better management decisions.

This manual has been put together through the support of the Catholic Relief Services (CRS) "Soya ni Pesa" Project as a tool to help researchers, extension officers, and growers know the major soybean diseases, insect pests, and symptoms/signs, and the available management options to enhance their diagnostic skills. This knowledge is expected to help growers easily identify diseases and pests and help in the choice of management measures. This is expected to improve disease and pest management and lead to increased soybean productivity through attaining better yields thereby contributing to household incomes.

IITA

The **International Institute of Tropical Agriculture** (IITA) is one of the world's leading research partners in finding solutions to hunger, malnutrition, and poverty. IITA is engaged in research for agriculture development in Africa and aims to lift 11 million people out of poverty and turn 7.5 million ha of land into sustainable use. This is achieved through the combined synergistic effects of increasing crop yields, enhancing system productivity resilience, decreasing losses due to pests and diseases, improving postharvest management including food safety, and promoting competitive agro-enterprises. IITA works with partners to develop and disseminate technologies that suit the farmers. The major focus crops are soybean cowpea, maize, yam, cassava, plantain and bananas.

CRS

Catholic Relief Services (CRS) has been providing assistance to vulnerable communities in Tanzania since 1962. In the agriculture and livelihoods sector, CRS supports many rural communities in fighting disease outbreaks on staple crops such as cassava and banana. CRS in collaboration with International and national research institutions disseminate improved technologies to farmers including quality (improved disease tolerant) planting materials, in particular, cassava and sweetpotato planting materials. In addition to the material input, farmers receive adequate training in pest and disease monitoring and management.

Currently CRS in conjunction with local Tanzanian partner organizations is implementing the “Soya ni Pesa” (Soybean is Money) project, an initiative to strengthen the soybean value chain in Tanzania by working with smallholder farmers and integrating them with markets. The project aims to deliver inputs and training in production techniques, market information and business development to enable farmers to boost yields, add value and increase incomes through soybean cultivation.

Acknowledgement

The authors would like to thank Catholic Relief Services (CRS)- Tanzania, for supporting the production of this manual through the “Soya ni Pesa” Project. The manual will help researchers, extension officers and growers to diagnose and better manage soybean diseases and insect pests to improve productivity.

Authors

Harun Murithi and Fen Beed (Plant pathologists)
International Institute of Tropical Agriculture (IITA)
P O BOX 34441
Dar es Salaam, Tanzania
E-mail: h.murithi@cgiar.org

Abubakar Kijoji (Agronomist)
Catholic Relief Services(CRS)
P O BOX 34701
Dar es Salaam, Tanzania
E-mail: abubakary.kijoji@crs.org