

Preventing and mitigating the effects of enset *Xanthomonas* wilt (EXW) in Lemo, Ethiopia

Key messages:

- 30% of enset crops were affected by EXW and 60% of respondents were able to identify the symptoms of the disease.
- 42% of farmers erroneously believed the disease was caused by the wind.
- While farmers correctly identified contaminated farm tools as a major source of EXW transmission, none had taken measures to prevent transmission. They expect chemicals would prevent the disease transmission.
- A systematic operational approach to EXW management should be adopted, including training on production and handling practices.

The issue

Enset (*Enset ventricosum* also known as ‘false banana’) is a source of food, cash, animal feed, medicine, sources of fuel wood and other products and services for smallholder farmers in Ethiopia. Enset *Xanthomonas* wilt (EXW) caused by bacterium *Xanthomonas campestris* pv. *musacearum* is a major constraint to enset production in Ethiopia, endangering the livelihoods of millions of farmers and threatening the food security of over 15 million people for whom enset is a staple food (Brandt et al. 1997).

In recent years, EXW has pushed farmers to reduce significantly enset cultivation, causing changes in cropping systems and dietary practices in enset growing areas. Of the diseases and pests facing farmers in Lemo woreda—EXW, enset root mealybug, leaf hopper, mole rat, porcupine, wild pigs, corm rot, and drought—EXW has had the greatest impact on enset production (Yemataw 2014).

Findings

Based on the findings from a baseline survey in Lemo district, farmers identified various enset production constraints in their locality (Figure 1). EXW is the most important constraint to enset production. Nearly 30% of farmers reported the existence of EXW in their fields and almost 90% reported a wilting and yellowish leaf or yellowish leaf as the symptoms of disease. The remainder

stated that it can be first noticed in the flag leaf and inflorescence of the plant, and moves towards the pseudo-stem (Figure 2).

Most respondents (50-60%) correctly identified the principal means of EXW disease transmission from an external source to the farmers’ fields, from infected to healthy plants via contaminated tools and insects, even if a minority erroneously identified smoke, animal dung, and wind transmission (Table 1). However, most farmers’ understanding of how the disease is caused had no basis in scientific fact, citing birds, insects, wind and highly fermented dung during the wet season as the causal agents of the bacteria, while nearly 30% said they did not know.

More than 90% of farmers reported that certain enset cultivars were less susceptible to EXW. These EXW-tolerant cultivars include: Unjame, Siskela, Kombotira, Agade, Gimbo, Abatmerza, Dirbo, Gishera, Disho, and Agororiya. Further research is needed to evaluate their perceptions and the basis for these.

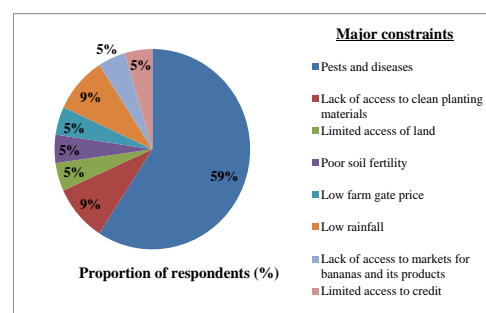


Figure 1: Major constraints of enset production in Lemo woreda

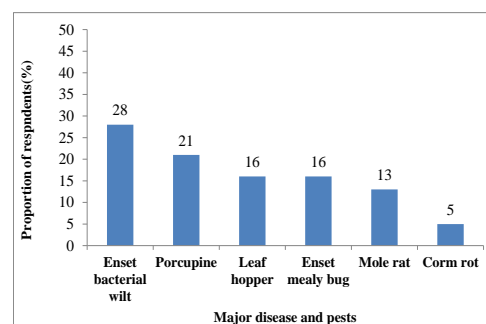


Figure 2: Important disease and pest affecting enset in Lemo woreda

Table 1: Farmers' perceptions on EXW symptoms, causal agents and mechanisms of transmission in Lemo

Variable	Category	Proportion of respondents (%)
Identify EXW infected onset	Yes (%)	100
	No (%)	0
How do you identify if it is EXW or not? (%)	Yellowish leaf	58.1
	Start in florescence and goes to other parts	12.9
	Wilting and yellowish leaves	29.0
Cause of EXW (%)	Wind	41.2
	Highly fermented dung during wet season	20.6
	Insects	11.8
	Birds	2.9
	Unknown	23.5
Mechanism of EXW disease transmission from external source to farmer field and from infected to healthy plant	Farm tools, smoke of burning infected onset, cattle dung	61.8
	Air	23.5
	Birds	5.9
	Unknown	8.8

Conclusions

Most of the farmers are aware of the existence of EXW disease, and that using contaminated tools is a major route of transmission. Whether or not they possess the knowledge of disinfection practices is unclear. But they are not taking any preventative or disease control measures. They have not taken any steps to change their cultural practices (fertilization, plant population management practices and inter-cropping), nor have they taken any sanitary enhancement measures, all of which would reduce the likelihood of contamination and transmission of EXW.

To reduce the likelihood of incursion, establishment and growth of EXW in onset crops, a systematic operational approach to the management of EXW should be adopted. This should include giving training to farmers on appropriate production practices, using healthy suckers and planting in clean soils. Additional factors to be considered in controlling the disease should include: sanitation, cultural and postharvest handling practices, crop rotation with non-host plants, and the use of available tolerant or resistant varieties.

Methodology

A household-level survey was conducted Jawe and Upper Gana *kebeles* in Lemo *woreda* from August to September 2014. Twenty households were randomly selected in each site, giving a total of 40 households. In addition to face-to-face interviews, two focus group discussions were carried out to complement the information obtained from individual farmers. Fifteen farmers from each *kebele* were identified to conduct in-depth interviews and follow-up on issues of interest raised during individual interviews.



The Africa Research In Sustainable Intensification for the Next Generation (Africa RISING) program comprises three research-for-development projects supported by the United States Agency for International Development as part of the U.S. government's Feed the Future initiative.

Through action research and development partnerships, Africa RISING will create opportunities for smallholder farm households to move out of hunger and poverty through sustainably intensified farming systems that improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.

The three projects are led by the International Institute of Tropical Agriculture (in West Africa and East and Southern Africa) and the International Livestock Research Institute (in the Ethiopian Highlands). The International Food Policy Research Institute leads an associated project on monitoring, evaluation and impact assessment.

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