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site of a few plants in one village (Bwere hill) to a radius of approximately 10 km. Towards the centre of this area the yield is almost reduced to zero, which has an alarming impact on food security. Many bananas continue to produce suckers but these are invariably infected from the motherplant and rarely flower (Ndungo and Kijana 2004). The disease is also more intense close to five small lakes. The first and second authors have recently observed a new disease focus about 20 km from the first one, so continued vigilance and control actions are necessary. Infected flowers are much less common and it appears that the principal mode of spread may differ from the one in Uganda. In DRC, control will be more a matter of trying to eradicate the disease and cleaning up infected fields rather than removing male buds to prevent insect transmission.

It is impossible to ascertain the origin of the outbreak. One hypothesis is that the disease has recently spread from wild enset plants, which are found on nearby hillsides

and swampy areas. It may thus be prudent to destroy enset plants in the immediate vicinity of cultivated bananas and the presence of the disease in enset should be investigated. Apart from enset, no other alternative host has been demonstrated so far. It is possible that the bacteria can infect other closely related species (such as Zingiberaceae, Marantaceae and Cannaceae) but so far there is no evidence that this occurs in nature, and even if it does, it may not be important for the spread of the disease.

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## Bacterial wilt (*Xanthomonas campestris* pv. *musacearum*) on enset and banana in Ethiopia

Enset (*Ensete ventricosum*) is a staple food for over 12 million people in the southern highland areas of Ethiopia. It grows best at altitudes ranging from 2000 to 2700 m (Brandt *et al.* 1997). Enset bacterial wilt was first reported in Ethiopia by Yirgou and Bradbury (1968) and is currently found in all the enset growing regions and on wild enset plants, although it has not been reported on enset in other countries. It is mainly spread through infected farm tools, infected planting material, repeated transplanting that damage the corm and roots, animals fed infected plants and possibly insects feeding on the foliage. Since cultivated enset is harvested for its starchy pseudostem and corm, it is not normally allowed to flower. As a result, the question of insects infecting flowers does not normally arise, but symptoms typical of insect transmission have been observed on banana flowers (Yirgou and Bradbury 1974).

An enset and banana pest and disease survey, funded by the Flemish Association for

Development, Co-operation and Technical Assistance (VVOB), has recently been conducted in the main enset and banana growing regions. The largest banana producing area is located at Arba Minch in southern Ethiopia (1200 m) (Figure 1). This area is geographically separated from the wetter highland areas where enset is grown. No banana bacterial wilt has been reported so far in this area.

The second banana growing area is located in western Ethiopia and most of the bananas are found between 1050 and 1700 m (Figure 1). Distances of over 100 meters between plots are very common. Although it is not the main crop, enset is also grown in this area and enset bacterial wilt is present. Most farmers indicated that the disease (locally called cholera) has been present on enset and banana for some 20 years. The varieties grown in this region are 'Kenya' ('Dwarf Cavendish'), 'Faranji muz' ('Pisang awak'), 'Abesha muz' (a matooke

clone) and 'Red abesha' ('Uganda red'), all sweet bananas. Bacterial wilt seems more common on banana than on enset. The farmers indicated that banana bacterial wilt mainly attacks 'Pisang awak' and in some cases 'Red abesha'.

Male bud infection was observed on a large number of 'Pisang awak' mats in the areas below 1700 m. A few farmers reported infection in their matooke clones. 'Dwarf Cavendish', which is very widely grown in this region, apparently does not get infected. It is believed that the absence of male bud infection is linked to the persistent male bracts, which could constitute a barrier to insect transmission. This observation is in agreement with a report from Bakelana and Ndungo (2004), who stated that the Cavendish varieties present in eastern Democratic Republic of Congo (DRC) were the last genotypes to get infected.

Scattered banana mats are also found in the south-central enset growing region, in areas over 1700 m. Male bud infection has not yet been observed in this region, possibly because the higher altitude and lower temperatures are not favourable to insect vectors. This is in agreement with observations made at over 1700 m in North Kivu, DRC, where male bud infection is very uncommon. In contrast, male bud infection has been postulated to be one of the primary causes of new infections in Uganda (<1600 m), and is widespread in south-western Ethiopia (<1700 m).

Numerous extension activities have been conducted or are ongoing in Ethiopia to control enset bacterial wilt. However, no

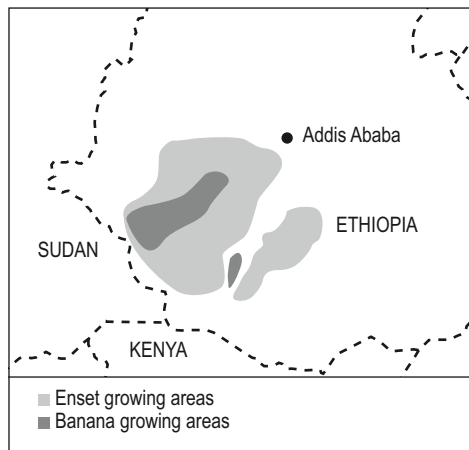


Figure 1. Main enset and banana growing regions in Ethiopia (adapted from Brandt et al. 1997).

active banana bacterial wilt eradication programme is currently operational. Early removal of the male bud is not practiced. Given that the cultivation of bananas is a growing activity, focus should be put on controlling the disease and preventing its spread through timely debudding, the removal of infected plants, the use of clean farm tools and clean planting materials.

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## Recommended names of banana diseases and their pathogens

Three plant pathologists with experience with banana diseases, David Jones, Chris Hayward and John Thomas, have worked with the International Society for Plant Pathology's Committee for Common Names of Plant Diseases (ISPP-CCN) to prepare a list of recommended names of diseases of bananas. This list is accompanied by a second list of pathogen names (mainly bacteria,

fungi and viruses), which includes selected important literature references. These two lists have been placed on the ISPP-CCN website at <http://www.isppweb.org/names/common.asp>.

Choosing the "best" name for a disease can be difficult. A disease may have multiple names, depending on the country, locality or user. Internationally, as many