The mission of the **International Network for the Improvement of Banana and Plantain** is to increase the productivity and stability of banana and plantain grown on smallholdings for domestic consumption and for local and export markets.
INIBAP has four specific objectives:
- to organize and coordinate a global research effort on banana and plantain, aimed at the development, evaluation and dissemination of improved cultivars and at the conservation and use of *Musa* diversity;
- to promote and strengthen regional efforts to address region-specific problems and to assist national programmes within the regions to contribute towards, and benefit from, the global research effort;
- to strengthen the ability of NARS to conduct research on bananas and plantains;
- to coordinate, facilitate and support the production, collection and exchange of information and documentation related to banana and plantain.

In May 1994, INIBAP was brought under the governance and administration of the International Plant Genetic Resources Institute (IPGRI) to enhance opportunities for serving the interest of small-scale banana and plantain producers.

The International Plant Genetic Resources Institute is an autonomous international scientific organization operating under the aegis of the Consultative Group on International Agricultural Research (CGIAR). The international status of IPGRI is conferred under an Establishment Agreement which, by December 1995, had been signed by the Governments of Australia, Belgium, Benin, Bolivia, Burkina Faso, Cameroon, China, Chile, Congo, Costa Rica, Côte d'Ivoire, Cyprus, Czech Republic, Denmark, Ecuador, Egypt, Greece, Guinea, Hungary, India, Iran, Israel, Italy, Jordan, Kenya, Mauritania, Morocco, Pakistan, Panama, Peru, Poland, Portugal, Romania, Russia, Senegal, Slovak Republic, Sudan, Switzerland, Syria, Tunisia, Turkey, Ukraine and Uganda. IPGRI's mandate is to advance the conservation and use of plant genetic resources for the benefit of present and future generations. IPGRI works in partnership with other organizations, undertaking research, training and the provision of scientific and technical advice and information, and has a particularly strong programme link with the Food and Agriculture Organization of the United Nations. Financial support for the agreed research agenda of IPGRI is provided by the Governments of Australia, Austria, Belgium, Canada, China, Denmark, France, Germany, India, Italy, Japan, the Republic of Korea, Mexico, the Netherlands, Norway, Spain, Sweden, Switzerland, the UK and the USA, and by the Asian Development Bank, IDRC, UNDP and the World Bank.

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New Frontiers in Resistance Breeding for Nematode, Fusarium and Sigatoka

Proceedings of the workshop held in Kuala Lumpur, Malaysia 2-5 October 1995

Edited by
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and D. De Waele

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Evaluation of FHIA-01 (Goldfinger) and some Commercial Cavendish Clones under Malaysian Conditions

S.H. Jamaluddin

Introduction

Banana production in Malaysia covers a wide spectrum of activities ranging from the small-plot subsistence farming and local market supply to plantations producing quality fruits for export. Between 1985 and 1992, fruit acreage has increased from 120 000 to 200 000 ha and banana ranked second after durian in acreage and fifth after durian, starfruit, papaya and watermelon in production. Banana export value (totalling RM13.9 million: US$5.5 million) contributed about 10% of the total export earnings from fruits in 1991 (Department of Statistics 1992). Of the 40 000 ha under banana cultivation, almost half is now cultivated with the AAA Cavendish types for export; the other half is planted with local cultivars such as Pisang Mas (AA group, syn. Sucrier), Pisang Berangan (AA, syn. Lakatan), Pisang Rastali (AAB Silk subgroup), Pisang Raja (AAB, Plantain subgroup, French type) Pisang Nangka (AAB), Pisang Awak (ABB) and Pisang Abu (BBB Saba subgroup).

In recent years, threats from the major banana diseases, especially *Fusarium oxysporum* f.sp. *cubense* (*Foc*) and black leaf streak/black Sigatoka (BLS/BS), have been felt by the banana growers, particularly in the plantation sectors where bananas are grown on a monoculture basis, making the spread and effects of the diseases more significant. Efforts have been made by various sectors, including local research institutions and universities, to control the disease but so far no major achievements for effective control have been made. So, when FHIA-01, an AAAB selected hybrid, was released by the banana breeding programme of FHIA, Honduras and accredited with resistance to *Foc* and Sigatoka leaf diseases, expectations were high for this wonder banana in many countries facing the threat of these diseases. FHIA-01 has been evaluated in many countries worldwide with positive feedback, and in Australia it was so well received that FHIA-01 was released and named Goldfinger in

MARDI, Serdang, Malaysia

May 1995 (Daniels *et al.* 1995a, 1995b). Malaysia too has high hopes for the performance of this hybrid as a solution to our disease problems, under Malaysian conditions.

Performance of FHIA-01 (Goldfinger)

Banana clones cultivated for export in Malaysia are mainly of the Cavendish subgroup. The popular ones are Williams (from Honduras and Australia) and Montel (a semi-dwarf Grande Naine type from the Philippines). Recently a new potential clone Novaria was released, which is an early flowering mutant of Grande Naine, induced by gamma irradiation at IAEA, as reported by Tan *et al.* (1993). This mutant has generated some interest among the local farmers.

FHIA-01 was compared with these clones to assess its performance. The results presented here, however, are preliminary as only data for the first crop are available. Evaluation is still ongoing to determine the stability of the agronomic characters and disease resistance for at least three crop cycles. Table 1 gives the agronomic characteristics and *Foc* resistance status of FHIA-01 and the other Cavendish clones.

Plant characteristics

FHIA-01 is about 27-29 cm taller than the other Cavendish types, Novaria, Montel and Williams. With the broadest girth of 62.0 cm, it is a very robust and sturdy plant. However, FHIA-01 takes longer to shoot: 3-4 months later at 11.0 months. The earliest Cavendish clone to shoot was Novaria at 7.1 months, followed closely by Williams (7.4 months) and Montel (8.2 months).

Yield and fruit quality

Generally, FHIA-01 is a better yielder that the other clones with a bunch weight of 26.2 kg compared with 20.9-22.9 kg for the others, giving a total production of about 35.0 t/ha. Montel and Novaria gave about 30 t/ha while

Table 1. Agronomic characteristics and *Foc* resistance status of FHIA-01 (Goldfinger) and other Cavendish clones

	Plant height (cm)	Girth (cm)	Time to shooting (months)	Bunch weight (kg)	Yield (tons/ha)	Finger length (cm)	*Foc* (% of infected plants)
FHIA-01	211.0	62.0	11.0	26.2	34.9	19.1	resistant
Novaria	182.0	57.9	7.1	22.1	29.5	20.8	18.0
Williams	184.0	57.3	7.4	20.9	27.9	19.5	10.0
Montel	182.0	57.19	8.2	22.9	30.1	20.6	27.5

Plant density = 1333 plants/ha

Williams only 28 t/ha. However, for fruit length, although it is comparable to the other Cavendish standards, it gave the shortest finger at 19 cm compared with 21 cm for Novaria and Montel.

Foc resistance

FHIA-01 has its strength in its resistance to the major banana diseases (Rowe 1994) and this was confirmed by its total *Foc*-free status during the trial period, compared with 27.5% infection for Montel, 18% infection for Novaria and 10% infection for Williams (Honduras) during the first crop cycle.

Comparison with the local clones

Besides the performance of FHIA 01 in relation to the Cavendish types grown for export, it would be of local interest to the farmer to gauge the performance of FHIA-01 in relation to the popular local clones. Table 2 gives a summary of the agronomic characteristics of FHIA-01 compared with popular local clones.

FHIA-01 gives the highest yield at 34.9 t/ha compared with the next best local clones, Pisang Awak (27.4 t/ha) and Pisang Nangka (25.4 t/ha) which are both cooking bananas. The dessert clones Pisang Mas, Pisang Rastali and Pisang Berangan are not comparable to FHIA-01, with yields of 16.0, 18.0 and 21.3 t/ha respectively. Except for Pisang Tanduk with its unique trait of extremely long fingers, FHIA-01 has almost the longest fingers at 19.1 cm, next only to Pisang Nangka (21 cm). However, a much longer time

Table 2. Agronomic characteristics of FHIA-01 (Goldfinger) and other popular local clones

	Time to shooting (months)	Yield (t/ha)	Finger length (cm)
FHIA-01 (Goldfinger)	11.0	34.9	19.1
Pisang Mas (AA Sucrier)	6.0	16.0	9.5
Pisang Berangan (AA Lakatan)	8.3	21.3	15.0
Pisang Rastali (AAB Silk)	8.3	18.0	11.5
Pisang Nangka (AAB)	6.5	25.4	21.0
Pisang Tanduk (AAB Plantain, Horn type)	8.5	10.0	35.1
Pisang Raja (AAB Plantain, French type)	9.5	18.1	15.7
Pisang Awak (ABB)	8.6	27.4	13.5
Pisang Abu (BBB 'Saba')	9.3	19.4	13.1

Plant density = 1333 plants/ha

to shooting (11 months) could be a slight disadvantage for FHIA-01 when most of the local clones come to shooting at 6-8 months.

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