

Agung Karuniawan

**Cultivation status and genetic diversity
of yam bean (*Pachyrhizus erosus* (L.) Urban)
in Indonesia**



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(*Pachyrhizus erosus* (L.) Urban) in Indonesia**

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List of Abbreviations

ARTC	Andean Root and Tuber Crops
CATIE	Centro Agronomico de Investigacion y Ensenanza
PC-i	Principal component-i
DNA	Deoxyribo Nucleic Acid
EC	Erosus cultivated (<i>P. erosus</i>) accession
ENT	East Nusatenggara
G	Genotype
ha	Hectare
L	Location
mM	Millimolar
mm	Millimeter
ng	Nanogram
PC	Principal component
PCA	Principal Component Analysis
PCoA	Principal Co-ordinate Analysis
QTL	Quantitative trait loci
R	Replication
RAPD	Random amplified polymorphic DNA
t	Ton
TAE buffer	TRIS acetate buffer
TE buffer	TRIS EDTA buffer
UPGMA	Unweighted pair group method average
UV	Ultra violet
μl	Microliter
μM	Micromolar

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I. INTRODUCTION

1.1. Distribution, cultivation, and uses

The genus *Pachyrhizus* consists of five different species. The Mexican yam bean (*P. erosus*), the Andean yam bean (*P. ahipa*) and the Amazonian yam bean (*P. tuberosus*) are cultivated, whereas *P. panamensis* and *P. ferrugineus* are only found wild (NRC, 1979; Sørensen, 1996). Yam beans *P. ahipa* and *P. tuberosus* are only of local importance in South America, whereas *P. erosus* is grown in many tropical and sub-tropical regions in South America, Asia, and Africa. Yam bean is exclusively used for its tuberous roots (Sørensen, 1996; Sørensen et al., 1997). The fleshy tuberous root has a white succulent interior, which is flavourful and can be eaten raw. All yam bean species are diploid with a basic chromosome number of $n = 11$, and interspecific hybridisation between all cultivated yam bean species results in fertile and vigorous hybrids (Sørensen, 1996; Heredia, 1996; Grüneberg et al., 2003). *P. erosus*, also called by the common name "jicama", is a favourite food of Central America and South-east Asia, and is becoming popular as a salad vegetable in the US (NRC, 1979; Hoof and Sørensen, 1989; Sørensen, 1996; Sørensen et al., 1997).

Yam bean *P. erosus*, the first *Pachyrhizus* species described scientifically by Linnaeus in 1753, is believed to be native in South-western Mexico (NRC, 1979). Archaeological evidence reveals that this species was grown by the early civilisations of Mexico and Central America, such as the Aztecs and the Mayas (NRC, 1979; Sørensen, 1996). The Spaniards probably introduced the yam bean *P. erosus* to Southeast Asia via the Philippines in the 16th century (NRC, 1979;