

Induced Mutations for Accelerated Domestication-A Case Study of Winged Bean (*Psophocarpus tetragonolobus* (L.) DC)

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Abstract

Induced mutations have the ability to increase the rate of domestication of the many underexploited species of plants that may be potentially useful as source of food, forage and industrial raw materials. The process of domestication has been conditioned by single or major gene mutations. The role of mutagenesis in speeding up domestication, which is species dependent, is outlined in this paper. A case study of the role of induced mutations in the domestication of winged bean (*Psophocarpus tetragonolobus*) is also presented.

Key words: Genes, mutation, *Psophocarpus tetragonolobus*, winged bean

Introduction

Food production to meet the needs of the growing world population can be augmented by improving agronomic techniques and by growing genetically improved cultivars of a wide range of crops. This notwithstanding, there is the possibility to increase the range of crops either by aiming at new domesticates or by the existing cultigens (Smart, 1989). Underexploited and underutilized plants, which abound in the tropical ecosystem, may be useful in contributing to this objective. These are plants that may be potentially useful as source of food, forage or industrial raw material. Most of these plants have remained underexploited because they have received little or no research attention since emphasis has been on the cash crops for export.

It has been estimated that there are about 200,000 species of flowering plants worldwide of which about 3000 have been used by man for food, fibre, spices, etc. Out of this only 200 have been domesticated for commercial cultivation and barely 15-20 provide the bulk

of food for man (Anon, 1975). Although these plants are the vault of untapped genes, they remain underexploited.

In Ghana, there are over 35 plant species of about 16 families belonging to the group of neglected traditional food crops. Some of these crops include winged bean (*Psophocarpus tetragonolobus* (L.) DC), African yam bean (*Sphenostylis stenocarpa* Hochst ex A. Rich), Kersting's groundnut (*Macrotyloma geocarpum* Harms Marechal and Baudet) and Velvet bean (*Mucuna pruriens* DC var. *utilis*) (Adansi & Holloway, 1978).

In this paper the role of induced mutations in domestication of underexploited plants is highlighted.

The practice and acceleration of domestication

Plant domestication is a sympatric evolution (Zeven & de Wet, 1982). This implies that populations inhabiting the same geographic range become reproductively isolated. This process can be described as a process of