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THE STATUS AND POTENTIAL OF *VIGNA UNGUICULATA* (WALP) IN THE CARIBBEAN REGION

THEODORE U. FERGUSON

Caribbean Development Bank, Wildey, St. Michael, Barbados,

SUMMARY

In the Caribbean the yields of *Vigna unguiculata* Walp (cowpeas and bodie) are low and the agronomic technology used in the production system is poor. The yield potential for both cowpeas and bodie appears to be good but there is need for a concerted and directed effort into breeding high-yielding, disease-resistant varieties. *V. unguiculata* is well adapted to both the dry and humid tropics and appears to be free of anti-metabolites and other toxic elements.

INTRODUCTION

Vigna unguiculata Walp is a very important tropical legume and it is particularly significant in Africa where 90 percent of the World's production is grown. This legume is normally consumed as dry or mature ripe beans and as green immature pods. The young leaves are sometimes used as a spinach and some cultivars are cultivated for use as fodder. Some cultivars are also used as cover crops or as green manure.

Cowpea is the common name normally applied to all grain types, i.e., cultivars used for their dry or mature ripe beans. In the United States cowpeas are sometimes called Southern peas. Some names applied to specific groups of cowpeas in the Caribbean are black-eye pea, gub-gub and roundsifers (increase peas). Cultivars of *V. unguiculata* grown for the use of pods in the immature green stage as a vegetable are known as bodie in Trinidad; bora in Guyana; snake beans in the United States; sitao in the Philippines and yard-long or asparagus beans in most of the published literature. The pods of these vegetable types can vary in length from less than 15 cm to more than 85 cm. The names snake beans, yard-

long beans and asparagus beans are normally applied to cultivars producing long pods. The name bodie will be used in this paper to refer to all cultivars which are normally grown for use of their immature green pods. There are a number of cultivars which can be used as both grain and in the immature green pod stage. These cultivars are considered to be dual purpose types.

There is much confusion in the literature over the systematics of the genus *Vigna* with the result that some research workers when writing about cowpea or bodie simply use *Vigna* spp. The cowpea/bodie group of legumes are considered by some workers to consist of three species, *V. unguiculata*, *V. sinensis* and *V. sesquipedalis*. These three "Species" cross readily and produce fertile hybrids. It is therefore often difficult to classify cultivars when this classification is followed. In this paper they are all considered to be a single species *V. unguiculata* Walp.

THE STATUS

The Caribbean is currently a relatively very small producer of cowpeas. Limited quantities are grown throughout the Region and the group of cultivars most widely grown is black-eye peas. During 1970 Guyana produced 155,000 kg of dried black-eye peas and there are plans to substantially increase production in the near future. Large quantities of black-eye peas are consumed in the Region but most of this demand is met by imports from the United States. There is therefore a ready local market which can accommodate significant increases in local production. Gub-gub are white- or cream-seeded cultivars grown in Trinidad as grain; production is however low. In Barbados roundsifers (or increase peas) are brown-seeded grain types which are grown as a catch crop on sugarcane estates. Brown-seeded types are also grown in Jamaica, Martinique and Guadeloupe.

Bodie is well liked in many parts of the Caribbean and it is grown in relatively large quantities in Trinidad, Guyana and Surinam. Ali *et al* (1973) estimated that over 1.6 million kg of bodie were grown on 286 hectares in Trinidad during 1971. The production of pigeon peas during that year was also about 1.6 million kg. Production in territories other than the three listed above are currently negligible but

attempts are being made to expand production in these territories (Ferguson 1974).

Yields of cowpea and bodie in commercial production are generally low. Pierre (1975) estimated that in the Region cowpea yields are in the range 800-1,000 kg/ha. It is the author's view, however, that average yields are less than 600 kg/ha. The world average is about 390 kg/ha (Meiners and Litzenberger 1973) but yields of over 2,000 kg/ha have been recorded under experimental conditions. The yield of green immature pods of bodie is also low in the Region; generally less than 6,000 kg/ha. Bodie yields of over 25,000 kg/ha have, however, been recorded under experimental conditions.

The low yields of both cowpea and bodie are due to (1) the use of unimproved cultivars which are low yielding and susceptible to a range of pests and diseases and (2) the poor agronomic techniques utilised.

Cultivars of cowpea (except some black-eyes) and bodie (except Los Banos Bush Sitao No. 1) grown in the Region are vining types which require support and/or wide spacing. Many have a long crop duration and pods mature over an extended period of time. These factors in addition to low yields and susceptibility to pests and diseases limit large-scale cultivation. Cultivation is therefore mainly confined to small units which have very little scope for mechanisation. Cowpeas are often intercropped with corn which provide support for the vines.

In Trinidad and Tobago most of the bodie are grown in the county of St. Patrick especially in the Penal area where it is grown in rotation with rice. Most of the cultivars are vining but they are grown without support. Small quantities are grown in the counties of St. George, Caroni and St. Patrick. In the Aranguez area of St. George, production is very intensive and cultivars are normally staked.

In Guyana large-scale mechanised production of black-eye peas has recently started in the intermediate savannahs. The variety used is California No. 5 and production is completely mechanised.

V. unguiculata in the Caribbean is susceptible to a number of diseases and pests. Cowpea mosaic virus is perhaps the most widespread

disease. It is particularly serious in the wetter territories and bodie cultivars appear to be more susceptible than cowpea cultivars. Another important disease is *Cercospora* leaf spot for which the causative agents are *Cercospora canescens* and *C. cruenta*. Powdery mildew (*Erysiphe polygoni*) is a serious disease in some territories especially the drier ones. Bacterial blight (or bacterial leaf pustule) caused by *Xanthomonas vignicola* is another disease occurring in the Region. The crop is attacked by a large number of pests which include aphids, beetles, bruchids, leaf hoppers, pod borers and stink bugs. Bruchids (or seed weevils) are of the *Bruchus* spp. and they can lead to the total loss of a crop during storage. Bruchids are best controlled in the field through regular applications of insecticides.

THE POTENTIAL

With the exception of some work in the United States and in Nigeria *V. unguiculata* has received little continuous and in-depth research effort. A review of the literature seems to suggest that the greater proportion of the research effort has gone into the study of diseases (mostly cowpea mosaic virus) and some biochemical aspects. It is the author's opinion that greater attention should be given to plant breeding if rapid progress in crop improvement is to be made.

There is a great degree of genetic variation with *V. unguiculata* and combined with the ease of crossing the potential for rapid crop improvement seems good. Workers at the International Institute of Tropical Agriculture in Nigeria have been able to bring together a large broad-based world collection and have identified male-sterile and female-sterile lines. It is hoped that with this material they should be able to produce cultivars with a very much higher yield potential than those currently available. Within the Caribbean breeding programmes of a more limited nature are in progress in Puerto Rico and Guadeloupe.

In Trinidad workers at the Chaguaramas Agricultural Development Programme are selecting for high yielding black-eye cultivars. Work on the selection of improved cultivars is in progress in the Faculty of Agriculture at the University of the West Indies and a breeding programme will be mounted shortly. Los Banos Bush Sitaø No. 1 (T/V/71/1) has been released as a high yielding dwarf cultivar of bodie for general cultivation throughout the Caribbean (Ferguson 1973). Other promising dwarf

bodie lines at T/V/74/238 and T/V/74/240. A promising vining bodie is T/V/72/79 and a promising dry grain line for use as gub-gub is T/V/73/177.

One of the major problems facing research workers is finding high yielding cultivars acceptable to consumers in particular locations. There are distinct preferences in different localities which are based mainly on the colour of the seed coat and perhaps to a lesser extent, taste. For example, in Guyana and Trinidad black-eye types are preferred. This narrow preference will of necessity restrict the potential and rate of crop improvement.

V. unguiculata is in general susceptible to a number of pests and diseases but appear to be less susceptible than *Phaseolus vulgaris* (Pierre 1975). Some lines having resistance or immunity to a number of diseases have been released in Puerto Rico by USDA. The potential for producing disease-resistant high-yielding cultivars with good agronomic traits and consumer acceptability seems good.

V. unguiculata is the legume most adapted to the high temperatures of the tropics. Some cultivars, mainly grain types, are tolerant to drought stress and will yield well under these conditions; others (especially bodie cultivars) are highly adapted to the wet humid tropics. In general *V. unguiculata* is more adaptable to the extremes of the tropics than *P. vulgaris*.

One of the many factors limiting the more widespread use of tropical legumes in the diet is the presence of anti-metabolic and other toxic principles. The seeds of *V. unguiculata* are, however, relatively free from these. In addition, the seeds are highly palatable and are high in protein (22 - 35 percent). Methionine and cystine are the first limiting amino acids.

Current production can be increased substantially by the application of improved agronomic techniques. It is however felt that the breakthrough in production will come mainly through the development or introduction of improved and more adapted cultivars.

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