COWPEA IN INDIA
OTHER BOOKS BY SAME EDITORS

GUAR IN INDIA

Guar in recent years has achieved status of an industrial crop due to water soluble natural polymer galactomannan gum, used for versatile industrial purposes. The crop has great scope as foreign exchange earner and guar gum worth Rs. 1000/- crores may be annually exported. It is, therefore, in national interest that production of guar and its gum are sustained under the prevailing rainfed situations.

Technically the production of guar would be sustained if latest available know-how is compiled and made available to the intended consumers, growers and exporters. It would expose bottlenecks in the technological advancements on their implementation on the one, and their effective utilization on the other. A compilation on the latest research and developmental aspects aiming at boosting grain production, export of gum and seed meal, is therefore, judiciously required.

The book chapters have been devoted to genetic improvement, agronomy, genetic resources, fodder aspects, microbiology, physiology, pathology, entomology, gum quality, industrial aspects and seed production of guar. The contents of the book are comprehensive and convenient which may prove useful in academic and applied context.


MOTH BEAN IN INDIA

Moth bean is an important crop for arid areas. It has multi-uses and adapted to extremes of uncongenial ecological niches particularly, in areas receiving less rains with erratic distribution. The crop is credited with a number of adaptive morpho-physiological features. It however, requires genetic improvement in respect of efficient plant types, agronomic improvement, plant protection cares. There is also need on assessment of genetic resources available, quality considerations. Information on these aspects is scarce and unsystematically arranged. Efforts on compilation of available research results would pave a way for furthering moth bean in required aspects and fields. Efforts have, therefore, been made to collect as far as possible vast information covering past 50 years on moth bean related to different aspects of adaptation, genetic resources, genetic and agronomic improvements, plant protection strategies, biotechnological possibilities and quality considerations.

The book, it is hoped, would prove useful and informative to those concerned with moth bean in one respect or other.

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COWPEA IN INDIA

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FOREWORD

Cowpea, an ancient pulse, is characteristically adapted to dry habitats and fragile agro-eco systems of tropical and sub-tropical regions in Asia, Africa, Central-Southern America and parts of southern USA and Europe. It is considered as an important food legume for livelihood of millions of rural masses in the underdeveloped third world. This legume has great potential in India for successful cultivation in kharif and summer in northern India and throughout the year in peninsular regions. An important component of farming systems in resource constraint agriculture, it is vitally used for food, feed, forage, vegetable, green manuring purposes and grains are used for several snacks. Besides, providing substantial vegetable protein, cowpea is also a good source of essential amino acids viz., lysine, leucine and phenylalanine and minerals like calcium and iron. Initial fast growth of cowpea with broad and dropping leaves provides a rich soil coverage therefore, reducing soil temperature and conserving the soil during warm months.

Cowpea known for several adapted merits and common men’s uses, suffers from inherited defects and demerits of loose, tall, trailing-viny, indeterminate growth habits and late partitioning with poor conversion of large dry matter towards economic parts. Cowpea therefore, represents long repeated natural selections, resulting in poor productivity. Concerted and renewed efforts are, therefore, needed to alter its plant type which is more productive and
responsive to agronomic inputs imparted with inbuilt tolerance to specific biotic and abiotic constraints.

There is, therefore, need to collect and compile research results related to various production components, being generated through individuals, institutions and coordinated project and publish in condensed form so that relevant research results are used by the intended scientists, students and field workers. I applaud sincere efforts undertaken by the authors and congratulate them for bringing out present compilation “Cowpea in India” at the needed hour.

It is believed that present compilation would be of great use and help to all those engaged and interested in integrated development and advancement of cowpea in India.

Dt. 05.12.2003

(A.S. Faroda)
Chairman,
Agricultural Scientists’ Recruitment Board, ICAR
New Delhi
The national agricultural research has made significant achievements and strides in almost all the major food sectors. For instance, food grain productivity just stagnating to 522 kg ha\(^{-1}\) during 1950 appreciably surged to 1723 kg ha\(^{-1}\) during 2001, registering a remarkable gain of almost 3.3 folds, similarly productivity of other food commodities viz., fruits, milk, vegetables, fisheries and eggs have spurted to the tune of almost 1.6, 1.8, 2.1, 5.6 and 6.4 folds during this period. These achievements have nailed the continued success of Indian agricultural research and development efforts at the national and international levels. However, the cause of great concern and worry to us all is the sluggish and hovering contribution of pulses to the food grain basket. For instance, the proportional gap between cereals and pulses that was 5:1 during 1950 considerably widened to 11.5:1 during late nineties. Priorities of Indian agriculture R&D are therefore, concentrating at pulse production so as to provide nutritious balanced diets to majority of the inhabitants relishing on vegetarian food habits.

There can be several reasons for poor productivity of pulses including technological, social, financial, geographical, climatological etc., but important is delayed and slow technological breakthrough particularly, in seed based improvement that could have far reaching acceptance and adoption across the climatic zones and the farming communities.

Of more than two and half a dozen pulses, being grown in India, cowpea commonly known as *lobia* is one of principal ancient pulses. It is characteristically known for wide geographic distribution across the soil, soil inputs and climatological zones. Hence, it is widely grown in tropics and
sub-tropics of Asia, Africa, Central and Southern America and parts of Southern Europe and U.S.A. Central and Western Africa only account for more than 60% of cowpea area in the world. However, substantial cowpea production is realized from to drier regions of Nigeria. Cowpea growing countries in Asia are: India, Sri Lanka, Bangladesh, Myanmar, China, Korea, Thailand, Indonesia, Malaysia, Pakistan and Nepal. It is estimated to be cultivated in almost 12.5 million hectares of lands with annual production of almost 3.0 million tons worldwide.

In India, cowpea is grown as sole, inter-crop, mix-crop and in agro-forestry combinations, hence, exact statistics on its area are not available but is estimated to be cultivated in almost half of 1.3 million hectares of area occupied by Asian region. Cowpea considered as a minor pulse in India context is cultivated in arid and semi-arid tracts of Rajasthan, Gujarat, Karnataka, Tamil Nadu, Maharashtra and in traces in majority of other states.

Cowpea is known for drought hardy nature, its wide and droppy leaves keep soil and soi moisture conserved due to shading effects. Initial fast growth with fast penetrating root system and strong stomatal sensitivity justify its initial establishment in soil moisture deficit situations. Cowpea has multiple uses as food, feed, forage, fodder, vegetable and is a good source of protein, calcium and iron.

In spite of a series of adaptive and livelihood uses, cowpea is known for poor partitioning of large dry matter production towards pods formation, precisely it is characterized with poor source-sink relationship. It suffers from loose, spreading, viny-trailing plant type with delayed partitioning and maturity. The crop therefore, appears to have been evolved for survival importance and little for productive value. Besides, poor and less productive plant type, crop also suffers from serious fungal and bacterial diseases like, Anthracnose, Charcoal rot, Cercospora leaf spot, Bacterial blight and certain nematodes and viral diseases like, Root knot, CYMV etc, and insect-pests like, pod borer and bruchid species. Crop also suffers from poor agronomic response and susceptibility to shattering and salt adversity.
In view to improve cowpea for certain defects and bottlenecks, serious efforts have been undergoing at various institutions in individual capacity and coordinated manner generating vital technological information. The research results so generated during, past several years are still at large of technocrats, planners and those engaged in extension of new technological advancements to the grass root users.

In view of above, it would be quite appropriate to collect, compile and published the condensed research results of scholarly and practical relevance concerning cowpea pertaining to last five decades on plant improvement, genetics, genetic resources, its husbandry, biotic and abiotic aspects under one umbrella. The present compilation “Cowpea in India” represents first ever attempt in India as far cowpea research on aforesaid aspects are concerned.

It is believed that present compilation would be of great help and use to those engaged in all round cowpea improvement and development in India.

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14. Vegetable Cowpea – Future Prospects

— N.B. Gaddagimath
**Ideal Plant type**

Compact, erect, good branching with 2-3 pods per spike, early, medium to long tender stringless white or light green pods with bold seeds or fleshy firm fruits, low fiber, low bitter content, high protein with high glycosides suitable for all season are the highly suitable plant type for vegetable cowpea.

**Mean values of Fruit features of few Hybrid vegetable Cowpea breeds in offing 2003-04**

<table>
<thead>
<tr>
<th>Treat No.</th>
<th>Average Tender Fruit Length in cms</th>
<th>Average Mature Fruit Length in cms</th>
<th>Average Tender Fruit Weight in gms</th>
<th>Average Mature Fruit Weight in gms</th>
<th>Tender Fruit Colour</th>
<th>Mature Fruit Colour</th>
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<td>Light Green</td>
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<tr>
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</table>
Most Promising cowpea genotypes
Sporadic pods, lack of sink in susceptible genotype
Drought tolerant strain with profuse bearing during Kharif, 2002
Cowpea mosaic virus

Charcol rot (Disease of cowpea)
Sarpan Hybrid Vegetable Cowpea SCV 201

Sarpan Hybrid Vegetable Cowpea SCV 202

Sarpan Hybrid Vegetable Cowpea SC 13 (Dual Purpose Cowpea)