BLACK GRAM (URAD, ULUNDU)

Vigna mungo (2n = 22, 24)

Origin : India

Putative parents

V. trinerivus / *V. sublobata* or V.*mungo* var. *sylvestris*.

Breeding objectives

1. **Evolving medium duration high yielding varieties for dry land cultivation**.
   Co5 black gram. Suitable for dry land cultivation.

2. **Evolving short duration high yielding varieties suitable for irrigated conditions**.
   This can be used as mixed crop in cotton, turmeric Short duration varieties are Co2, Vamban 1, 2 and 3.

3. **Evolving short duration varieties suitable for rice follow condition**
   ADT 3.

4. **Breeding varieties resistant to diseases**
   YMV is a serious disease. Leaf crinkle virus, powdery mildew.
   VBN 1, Karaikal, BDN 1, VBN 2, VBN 3 - resistant to YMV

5. **Pest** : White fly vector for YMV and leaf crinkle, leaf eating caterpillar

6. **Breeding for better quality**
   24% protein. There are lines having 27% protein. These can be utilised Quality of black gram is determined by

a) Protein content
b) Methionine content 1.17%
c) cooking quality - Time
d) % of hard seeds.
e) Dhall recovery 70%

Breeding methods

1. **Introduction** :

E.g. T.9 from U.P.

2. **Pure line selection** :

Co3 - Alangudi local
Co5 - musiri local

3. **Hybridization and selection**

a) **Intervarietial**

KM 2 (Derivative from T9 x L.64)
TMV 1 - Derivative from Midhiulundu x KM1
ADT 4 - 29 x AD 2 x 6114

VBN 3 - LBG 402 x LBG 17.

b) **Inter specific** :

Vigna mungo x *V.mungo* var.*sylvestris* - Pant nagar. YMV resistant lines obtained. But pod shatters. More number of Back crosses suggested.

Vigna mungo x *V.radiata* for increasing pod length, digestibility. Sterility is the main problem. Few plants obtained revert back to parental form.

4) **Mutation breeding**

Variety Co4 - derived from Co1 by EMS treatment

5) **Embryo rescue** - Attempted in inter specific crosses.

Ideal plant type

For irrigated and Rice fallows

Determinate type, short duration, high dry matter producing with 30cm plant ht. Photo insensitive.

For rainfed condition.

Semi determinate with pod setting from base of the main stem; higher pod length and more number of seeds / pod.

BLACK GRAM VARIETIES FOR TAMIL NADU

VARIETIES

Varieties	Parentage	Duration
Co 4	Mutant of Co 1	70
Co 5	Pure line selection from Mustri Local	70-75
KM 2	Derivative from T 9 x L. 64	60-65
VBN 1	KM 1 x H 76-1	60-65
T 9	Pure line selection	65-70
ADT 2	Derivative from Thirunelveli Local x ADT 1	70-75
ADT 3	Pure line selection from Thriunelveli Local	70-75
TMV 1	Derivative from Midhiulundu x KM 1	65-70
ADT 4	29/ ADT 2 / Plant 6114	60-65
ADT 5	Pure line selection Kanpur variety	62
VBN 2	Reselection from T 9	70
VBN 3	LBG 402 X LBG 17	70

GREEN GRAM (MUNG BEAN)

vigna radiata (2n = 22)

It is esteemed as the most wholesome among the pulses, free from the heaviness and tendency to cause flatulence, which is associated with other pulses.

Place of origin : India

Wild relative : *Vigna radiata* var. *sublobata*

Breeding objective :

1. **High yield, medium duration dry land varieties**
   Co1 long duration, indeterminate plant habit.

2. **High yielding**, **short duration irrigated varieties** :
   Lines having rapid growth rate or dry matter increase associated with high harvest index. They must give high biological yield and productive racemes. Co2

3. **Breeding for rice fallows**
   ADT 2, ADT 3

4. **Breeding for disease resistance**
   YMV
   Leaf crinkle virus
   Tarai local Lm 214 - resistant

5. **Breeding for quality**
   a) Mung bean has highest digestibility among grain legumes from 83 to 90%. Varieties having bold seeds to use as sprouts is the aim.
   b) Transfer of high methionine content from black gram to green gram.
   c) High dhall recovery - 80% and more
   d) Less hard seed.

Breeding Methods :

1. **Introduction** - Pusa baisaki

2. **Pure line selection** - Co1

3. **Hybridisation and selection**

Inter Varietal : ADT 1, ADT 2, Co 5, VBN 1

Inter specific - To transfer high methionine content from black gram to green gram.
Green gram x *V.umbellata* rice bean to transfer resistance to bean fly crossing with *V.radiata* var. *sublobata* resistance to bruchids

5. **Mutation breeding**

Co4 - mutant of Co1

6. **Embryo culture** :

Green gram x Black gram

Ideal plant type

1. 60 - 65 duration with determinate habit for irrigated conditions
2. 80 days duration with indeterminate type for dry land condition

Plants with more pods and seeds, increased branches poding from base of main stem with synchronised maturity non - shattering habit.

GREEN GRAM VARIETIES FOR TAMILNADU

VARIETIES

Varieties	**Parentage**	**Duration**
Paiyur 1	Pure line Selection from DPT 703	85-90
ADT 2	AB-33 x ADT 1	70-75
ADT 3	Hybrid derivative H 70-16 / Rajemdran / G 65	66
Co 4	Mutant of Co 1	85
KM 2	Hybrid derivative of No. 127 x S.9	65-70
VBN 1	Hybrid derivative of S.8 x PIMS 3	65
Co 5	Hybrid derivative of KM 2 x MG 50.10 (G)	70-75
K1	Co 4 x ML 65	70
Co6	WGG 37 x Co 5	65

HORSE GRAM

Macrotylema uniflorum (2n = 24)

Place of origin : Hindusthan centre

Putative parent : Not known

Breeding objectives :

1. Increased yield :

Co1 Mudukalathur local

2. Non - Photo sensitive, short duration varieties
3. Varieties with low trypsin inhibitors

Methods of breeding :

1. **Introduction**

HPK varieties from Himachal Pradesh.

2. **Pure line selection**

Co1 from Mudukalathur local.
Paiyur 1 from Mettur local.

3. **Hybridization and selection**

a) Intervarietal

b) Interspecific

Dolichos lab lab x M. *biflorum*

Crossable.

4. **Mutation breeding**

SOY BEAN

Glycine max (2n = 40)

Place of origin : China.

Probable ancestors : *Glysine usuriensis*

Slender, viny plant with small seeds grows wild is Japan, Manchuria and korea. It is considered to be the progenitor for *G.max* Another view is that *G.max* arose form natural hybridization between G.*usuriensis* and G.*tomentella* which grows wild in china. A fourth species *Glycine gracilis* is intermediate between *G.max* and G. *usuriensis*. Cultivated types of G.*gracilis* are found in Manchuria. All the above species are crossable with each other. Many other species in *Glycine* have been identified but the exact classification of most of them is still in doubt.

Breeding objectives :

1. Breeding for short duration high yielding varieties

The yield of soy bean plant is determined by size, number of seeds per pod and number or pods / plant. The number of pods/ plant is determined by no of nodes / plant, number of pods / node. Each of the above components of yield are polygeneic in inheritance and so it is complex.

The duration is also determined by multiple genes. Maturity is correlated with height or the plant. Early varieties will be short is stature.

2. Breeding varieties suitable for rice fallows

Short plants 65 -70 days duration. Suitable for inter cropping also in banana and sugarcane.

3. Breeding for quality

a) Seed color and quality

b) Oil content and quality

c) Protein content

a) Seed coat color :

May be yellow, green black, brown or combination of all the above colours. For oil extraction yellow color is preferred because of high oil content where as black seeded varieties are low in oil content but high is protein content. Seed coat color other than yellow will give unattractive oil cake which is not preferred.

b) Oil content and quality :
Oil content greatly determined by environment :
Yellow seed coat varieties are rich in oil. Complex character determined by poly genes.

c) Protein content and quality :
Ranges from 35 to 50% protein content is negatively correlated with oil content so white breeding for high protein content a compromise is to be made.

4. **Breeding for vegetable type**
AVRDC, Taiwan has evolved vegetable types

5. **Breeding for forage type of soy bean**

6. **Breeding for non-shattering type**
E.g. Lee, Co2

7. **Breeding for YMV resistant lines**
Co 2

Breeding Methods:
1. Introduction :
Ec 39821 from Taiwan - released as Co1

2. **Pure line selection**
Co1

3. **Hybridization and selection**
Clark, Co 2 (AS 335 x UGM 21)YMV tolerance

4. **Mutation breeding.**

VARIETIES OF TAMIL NADU

Co 1 - Pure line selection from EC 39821
Co 2 - (AS 335 x UGM 21)
ADT 1 - Selection from HILL