CROP PROTECTION

Seed treatment: Treat the seeds with *T. asperellum* @ 4 g or *P. fluorescens* @ 10 g/kg or carbendazim @ 2 g/kg or thiram @ 4 g/kg seeds

Disease	Recommendations
Anthracnose and die-back: *Colletotrichum lindemuthianum*	Spray Mancozeb @ 1000 g or Carbendazim @ 250 g/ha soon after the appearance of the disease and if necessary, spray once again a fortnight later

(ix) SOYABEAN (*Glycine max* (L.) Merr.)

CLIMATE REQUIREMENT

T_Max°C	T_Min°C	Optimum °C	Rainfall mm	Altitude m MSL
40	10	25 - 32	600 - 750	2000

Tropical and subtropical warm and moist climate. Short day plant. It can withstand short periods of waterlogging and short drought.

CROP IMPROVEMENT

1. SEASON AND VARIETIES

DISTRICT/SEASON	VARIETIES
Adipattam (June - July) **Purattasipattam** (Sep. - Oct.) **Masipattam** (February - March) **Rice fallows**	Co(Soy)3

II. Description of soybean varieties

Particulars	Co (Soy) 3
Year of Release	2005
Year of Notification	SO.599(E)/25.04.2006
Parentage	Cross derivative of UGM 69 x JS 335
50% flowering	39 – 41 days
Duration (days)	90-100
Grain yield (Kg/ha)	
Rainfed	-
Irrigated	1700
Height (cm)	53.5
Branches	5 - 6
Flower colour	Pink
Colour of grain	Creamy yellow with brown hilum
100 seed weight (g)	10.95 – 11.75

2. SEED TREATMENT WITH FUNGICIDES

a) Treat the seeds with Carbendezim or Thiram @ 2g/kg of seed 24hrs before sowing or with talc formulation of *Trichoderma viride* @ 4 g/kg seed (or) *Pseudomonas fluorescens* @ 10 g/kg seed.

- Biocontrol agents are compatible with biofertilizers.
- First treat the seeds with biocontrol agents and then with Rhizobium.
- Fungicides and biocontrol agents are incompatible.

b) Coat the seeds with ZnSO4 @ 300 mg/kg using 10% maida solution as adhesive (250 ml/ kg) or gruel and arappu leaf powder (250 g/kg) as carrier to increase the field stand.

3. SEED TREATMENT WITH BIOFERTILIZER

a) Treat the seeds atleast 24 hours before sowing.

Treat the seeds with 3 packets (600 g/ha) of Rhizobial culture (COS-1) and 3 packets (600 g/ha) of Phosphobacteria developed at TNAU using rice *kanji* as binder. If the seed treatment is not carried out apply 10 packets of Rhizobium (2000 g/ha) and 10 packets (2000 g) of Phosphobacteria with 25 kg of FYM and 25 kg of soil before sowing. Dry the bacterial culture treated seeds in shade for 15 minutes before sowing.

4. FERTILIZER APPLICATION

i) Apply 20 kg N and 80 kg P_2O_5 and 40 kg K_2O per ha 40 kg of S as gypsum (220 kg/ha) as basal dressing. Soil application of 25 kg $ZnSO_4$, 25 kg $MnSO_4$/ha under irrigated condition if the soil is deficient of respective nutrients.

ii) Foliar spray of NAA 40 mg/litre and Salicylic acid 100 mg/litre once at pre-flowering and another at 15 days thereafter

iii) Foliar spray of DAP 20 g/litre or urea 20 g/litre once at flowering and another at 15 days thereafter

iv) Foliar spraying of 1% $FeSO_4$ + 0.1% citric acid thrice at 7-10 days interval.

5. SOWING

Dibble the seeds at a depth of 2 - 3 cm adopting a spacing of 30 x 5 cm. In Erode district, Soybean + Castor (60 cm apart) cropping system gives high net return.

6. WATER MANAGEMENT

Irrigate immediately after sowing. Give life irrigation on 3rd day. Further irrigation at intervals of 7 - 10 and 10 - 15 days during summer and winter season respectively to be given depending on soil and weather conditions. Soyabean is very sensitive to excess moisture and the crop is affected, if water stagnates in the fields. The crop should not suffer due to water stress from flowering to maturity. To alleviate moisture stress spray of either Kaolin 3% or liquid paraffin at 1% on the foliage. In Erode district cultivate Soybean + Castor with irrigation at 0.60 IW/CPE ratio (once in 10 to 12 days) is recommended.

7. WEED MANAGEMENT

i) Pendimethalin 1.0 litre /ha after sowing followed by one hand weeding on 30 days after sowing.

ii) If herbicide spray is not given two hand weedings on 20 and 35 days after sowing may be given.

iii) Early Post emergence application of Imazythypyr @ 50 g / ha may be applied as post emergence on 20 DAS with one hand weeding on 30 days after sowing.

8 HARVESTING

Yellowing of leaves and shedding, indicate the maturity of the crop. Cut the entire plant when most of the pods have turned yellow, drying and processing.

SOYABEAN IN RICE FALLOWS

Soyabean can be sown in rice fallows from middle of January to middle of March. Seeds can be dibbled at 75 kg/ha.

SPECIAL SITUATIONS

1. Optimum time of sowing Soyabean CO 1 - 2nd fortnight of June in *Kharif*
2. Intercropping of Soyabean CO 2 in Sugarcane is recommended for North Western Zone.
3. Intercropping of Soyabean in coconut gardens of more than 10 years is recommended.
4. Vermipelleting (50 g/kg) and adopting spacing of 30 x 10 cm and two foliar sprays of 2% DAP during flowering is recommended to achieve higher yield.

RAINFED SOYABEAN

i. VARIETIES

CO 1

ii. SEASON

The crop can be grown in South-West and North-East monsoon seasons. The middle of July is the optimum time of sowing for rainfed Soyabean in North Western Zone.

3. SEED TREATMENT WITH THE FUNGICIDES AND BIOFERTILIZERS

a) Treat the seeds with Carbendezim or Thiram @ 2g/kg of seed 24hrs before sowing or with talc formulation of *Trichoderma viride* @ 4 g/kg seed or *Pseudomonas fluorescens* @ 10 g/kg seed.

- Biocontrol agents are compatible with biofertilizers.
- First treat the seeds with biocontrol agents and then with Rhizobium.
- Fungicides and biocontrol agents are incompatible.

b) Treat the seeds required for ha. with three pockets of Rhizobium and 3 packets of Phosphobacteria

4. FERTILIZER APPLICATION

i) Apply NPK as per soil test recommendation as far as possible. If soil test recommendation is not available adopt blanket recommendation of 20:40:20:20 NPKS kg/ha, if adequate moisture is available.

ii) Apply entire dose of N, P, K and S as basal.

5. SPACING

Adopt a spacing of 30 cm between rows and 5 cm between plants in the row.

6. SOWING

Dibble or drill the seeds.

7. WEED MANAGEMENT

i) If sufficient moisture is available, Pendimethalin 1.0 litre/ha after sowing followed by one hand weeding on 30 days after sowing.

ii) If herbicide spray is not given, two hand weeding on 20 and 35th day after sowing.

iii) Early Post emergence application of Imazythypur @ 40 g ai/ha applied as pre emergence on 20 days after sowing with one hand weeding on 30 DAS.

CROP PROTECTION

Spodoptera, Helicoverpa, *Spilosoma*, Semilooper, Leaf miner, Stem fly	*Bacillus thuringiensis* var. *Kurstaki*, Bio-tech. International @ 500-750 g/ha Chlorantraniliprole 18.5% SC @150 ml/ha Ethion 50% EC @1500ml/ha Flubendiamide 39.35% SC 150ml/ha Indoxacarb 15.8%EC 330ml/ha Profenophos 50%EC 1.0 l/ha Spinetorum 11.7% SC 450ml/ha
Girdle beetle	Profenophos 50%EC 1.0 l/ha Thiacloprid 21.7% SC750ml/ha
Leaf weevil	Malathion 50% EC @1500ml/ha Quinalphos 1.5DP 16kg/ha Quinalphos 25%EC 1.0 l/ha

Seed treatment: Treat the seeds with *T. asperellum* @ 4 g or *P. fluorescens* @ 10 g/kg or Carbendazim @ 2 g/kg or Thiram @ 4 g/kg of seeds

Disease	Recommendations
Rust: *Phakopspora pachyrhizi*	Spray Triadimefon @ 0.1 % or Propiconazole @ 0.1% or Hexaconazole @ 0.1% at flowering stage or at the onset of disease
Virus diseases **Yellow mosaic** (Gemini virus) (Vector –*Bemisia tabaci*) **Bud blight** (Ilarvirus) (Vector- *Thrips palmi*)	• Rogue out the virus infected plants up to 30 days • Two sprays with Thiamethoxam 25 WG @ 100 g/ha or Methyl demeton @ 800 ml/ha or Imidacloprid 17.8 SL @ 250 ml/ha at 30 and 45 days after sowing to control the vector

SOYABEAN - SEED PRODUCTION
VARIETAL SEED PRODUCTION

Land requirement

- Land should be free of volunteer plants. The previous crop should not be of the same variety or other varieties of the same crop. It can be of the same variety if it is certified as per the procedures of certification agency.

Isolation

- For certified / quality seed production leave a distance of 3 m all around the field from the same and other varieties of the crop.

Harvest

- Harvest the pods as they turn yellow in colour.

Threshing

- Thresh the pods either manually or mechanically using pliable bamboo sticks.

Seed grading

- Grade the seeds using 14 / 64” or 12 / 64” sieves based on the varieties.

Drying

- Dry the seeds to 7- 8 % moisture content.

Pre-storage seed treatment

- Treat with Carbendazim @ 2 g / kg of seed along with carbaryl @ 200 mg / kg of seed.
- Treat seeds with Halogen mixture ($CaOCl_2$ + $CaCO_3$ + *arappu* (*Albizzia amara*) leaf powder mixed in the ratio of 5:4:1 @ 3 g / kg as eco-friendly treatment.

Storage

- Store the seeds with a seed moisture content of 10 - 12 % in gunny or cloth bags for short term storage (8 - 9 months).
- Store the seeds with a seed moisture content of 8 - 10 % in polylined gunny bag for medium term storage (12 - 15 months).
- Store the seeds with a seed moisture content less than 7 % in 700 gauge polythene bag for long term storage (more than15 months).

(x) SWORD BEAN (*Canavalia gladiata L.*)

CLIMATE RQUIREMENT

T_Max°C	T_Min°C	Optimum °C	Rainfall mm	Altitude m MSL
38	10	15 - 30	700 - 4200	1500

Tropical and subtropical warm and moist climate. It is widely cultivated in the humid tropics.tolerates salinity and waterlogging. This crop can grow in light shade under trees to serve as a nitrogen - fixing cover crop.

CROP IMPROVEMENT

Sword bean SBS 1 is an introduction and is one of the vegetables with photo-insensitivity. It matures in 110 - 120 days. It can be grown throughout the year and gives good response to irrigation. Tender pods are ready for harvest from 75 days after sowing. As a pure crop it gives an average grain yield of 1356 kg/ha and green pod yield of 7500 kg/ha. This can also be grown as border crop, intercrop and a shade crop.

I. SEASON

June - July (Rainfed), September - October (Rabi), February - March (Summer).

II. DESCRIPTION OF VARIETY - SBS 1

Year of release	1990
Plant habit	Dwarf, erect, bushy
Pigmentation	Green
Branches (No)	4 - 6
Inflorescence	Axillary raceme
Flower	Bold, light purple