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SUGAR BEAN AGRONOMY



IT STARTS WITH THE RIGHT SEED

THE HOME OF BUMPER HARVESTS



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SC Bounty : Variety Descriptors

- Bright red speckles on pale cream seed base. White flowers
- High yielding i.e. excess of 2 t/ha under good management conditions
- Matures in about 85-115 days
- Bushy type with average height of 46cm
- Good tolerance to important bean diseases



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General conditions

- Best grown out of summer because of disease pressure and flower abortion due to excessive temperatures.
- Grow on wide range of soils, but pH of between 5.3 and 6.5 is ideal
- Requires a well prepared soil to a depth of 60-90cm
- Best grown on heavier and sandy loam soils with a clay content of >20%
- Grown throughout the year unless there are limitations of excessive T°C, lack of water, too much rainfall or frost.
- Temperature should not exceed 30° C at flowering. This may result in floral sterility. Floral and pod sterility may also result if temperatures drops below 15 degrees celcius
- Crop requires about 450-650mm of rainfall and or irrigation
- No rain expected at flowering and maturation. Avoid irrigating during flowering as this may result in flower drop



Irrigation Management

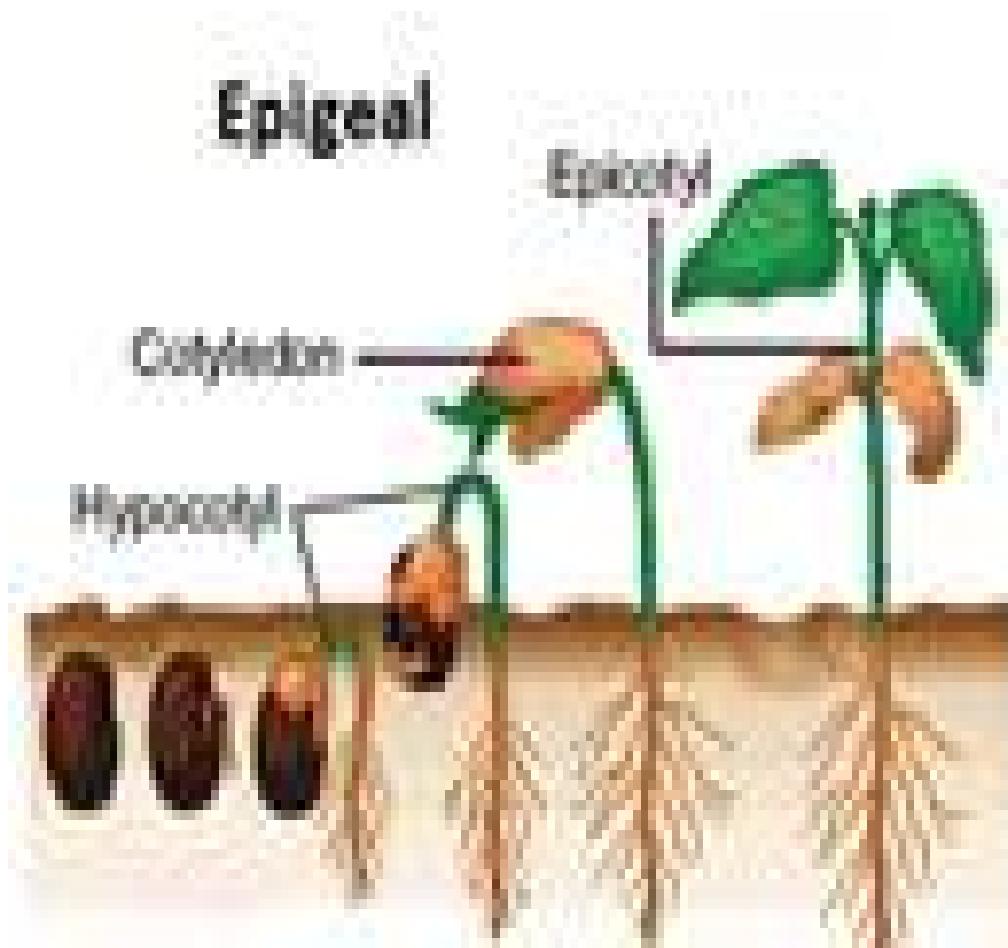
- 3 critical stages:
- Germination and emergence-30-40mm of irrigation soon after or before planting
- Irrigate to field capacity (depth of >60cm) before planting
- Followed by a lighter irrigation at day 2/3 after planting to break the crust
- Flowering-make sure you irrigate sufficiently just before flowering to avoid irrigating a flowering crop
- Pod setting-irrigate soon after flowering when pods start to set
- Stop irrigation when leaves turns yellow to brown otherwise rots may result

1. Land Preparation

- Select fertile to moderately fertile land with no water logging.
- Sugar bean does not tolerate acidic soils. Lime acidic soils to sweeten them and to achieve a pH range of 5.3 to 6.5.
- Clear all vegetation and prepare the field manually with a hoe, or use animal power or a tractor.
- Deep ploughing to aid drainage and good root development followed by discing and rolling to ensure a fine tilth
- You can plant sugar bean on ridges or on a flat seedbed.
- Planting on ridges helps prevent waterlogging, which damages the sugar bean plants.
- Well-prepared land with a fine tilth ensures good germination and reduces weed infestation



Why Fine tilth?



- Sugar bean is not a good germinator
- It endows epigeal germination characteristic
- Hence a fine tilthed soil
- Fine tilth enhances a good seed to soil contact

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2. Planting

- Seed dressing with Thiram or Captan is a must to prevent against early disease development
- Always plant in cool moist soils after receiving >35mm of rains/irrigation
- Mark out furrows of 5 to 7 cm deep
- Interrow spacing should be 35 to 60cm
- Band basal fertilizer on the furrows using the string method
- Cover with a 2cm film of soil before planting to avoid direct seed-fertilizer contact
- Cover at a depth of 3.5 to 4.5cm in heavier to lighter soils.. Respectively
- Gently press soil after covering to ensure good seed-soil contact which enhances good water absorption and germination and emergence

Planting

- **Seed Rate:** 80-100 kg/ha and seed should be treated with a fungicide such as Thiram or Captan and Gaucho as a pesticide against leaf miners
- **Planting Depth – 3.5 to 4.5cm**
- **Spacing:** 45-50 X 4-10 cm giving 220 000 plants/ha to 330 000 plants per Ha.
- **Time of planting:** Start mid February in the low veld under irrigation



Fertilisation

- Apply fertilizer based on soil analysis recommendation
- General recommendation: Basal dressing Compound D (200 to 300kg/Ha), Cereal Blend (150-250kg/Ha), Double D (100-150kg/Ha), SSP (225kg/Ha).
- Use cup number 5 to band 30-40cm stretch to apply 200kg/Ha assuming 50cm interrow
- Apply top dressing at 2-6 weeks after emergence but before flowering after the rains/irrigation when the soil is moist
- 150-200kg/Ha of AN is enough to avoid rank growth



3. Pre-emergence weed and pest control

- Always spray pre-emergence herbicides and pesticides (against early pests such as cutworm), soon after planting (within 2 days) when the soil is moist
- The moisture is necessary to activate the Pre-E herbicide and to create a herbicide layer which suppresses weeds for a good crop head start
- Avoid fields which had Atrazine in previous season as this retard growth and reduce yields.



Weed Control

Pre-emergence

Frontier
Optima
Metalachlor
Basagran
Alachlor
Bateleur Gold



Post-emergence

Imazamax, Pursuit, Afalon, Basagran, Fusilade, Agil (

4. Important Pest: Bean Stem Maggot control



- Spray Diazinon at days: 3, 6, 13 and 20 after crop emergence as a preventative and combating against this pest

5. Pest Control



Bean stem maggot



Aphids

- Aphids and white flies are sap sucking and should be controlled

Pests – leaf Minor

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- Leaf minor predisposes the beans to secondary bacterial infections
- Chemical control may be expensive and ineffective. Treat seed with Gaucho or Cruizer.

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Pests and Control

Bean stem maggot, cutworm, aphids, white flies, blister (CMR) beetles, chafer beetles, stink bugs and bollworms, semi loopers



Foliar spray

Thionex, Karate Zeon 5CS, Lambda, Dimethioate, Blast Super & Cabaryl

6. Diseases and control

Disease

- Scout for rust, angular leaf spot and anthracnose (fungal), common and halo blight (bacterial), bean mosaic virus (viral).
- NB: *Sclerotinia sclerotiorum* is prohibited in seed crops.
- 0.1% anthracnose and
- 0.1% bacterial blight tolerated.

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Viral diseases – Bean Common Mosaic Virus



- Symptoms include curled and malformed leaves that have alternate dark green and light green areas giving the mottled or mosaic effect. Spread by aphids.
- **Prevention and treatment**
 - No treatment.
 - Use fresh seed avoid susceptible cultivars

Bacterial diseases – Common Blight



- Common blight – large necrotic lesions surrounded by bright yellow chlorotic areas. Cause leaves to drop prematurely
- Avoid excessive irrigation.

Halo Blight

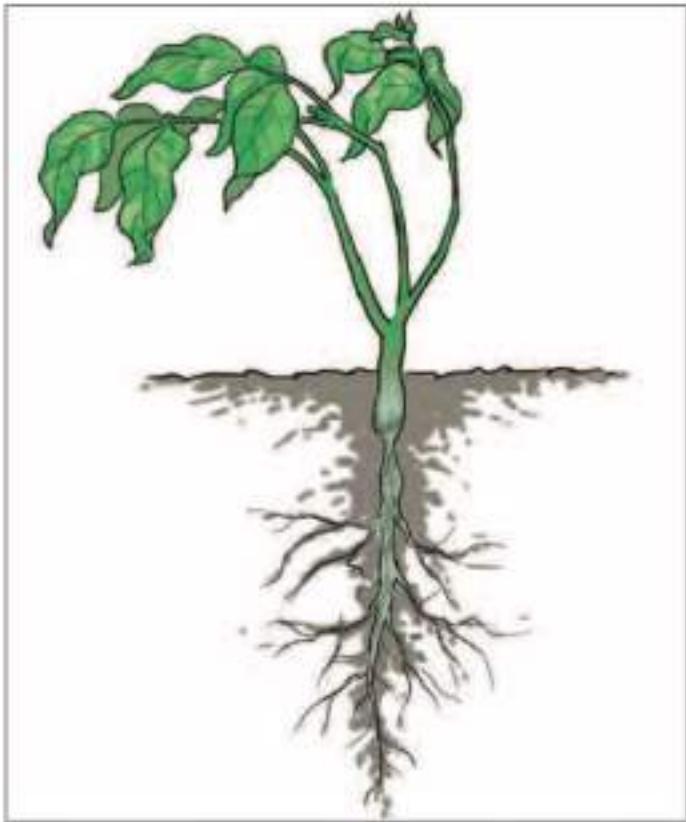


- Halo Blight – Pale yellow halo
- Prevention – use copper based chemicals like copper oxychloride
- Use of disease free seed

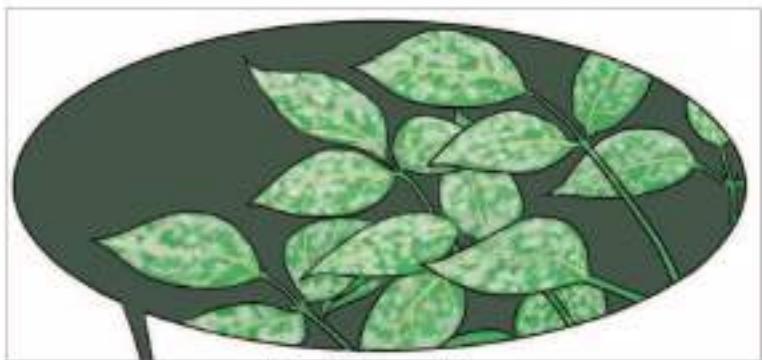
Fungal diseases



- Sclerotinia
sclerotiorum, Powdery mildew, cercospora leaf spot, rust
- Avoid over head irrigation and put a fungicide at first sign of disease



***Rhizoctonia* root rot**



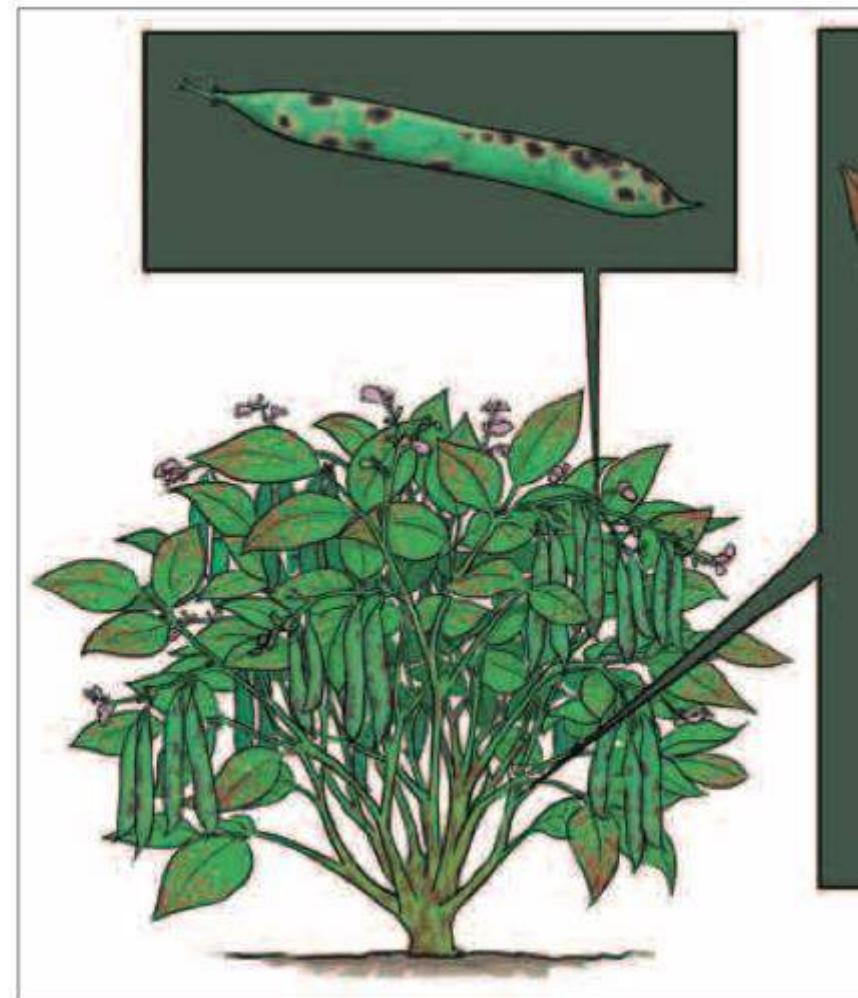
Powdery mildew

Bean Rust



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Anthracnose (fungal)



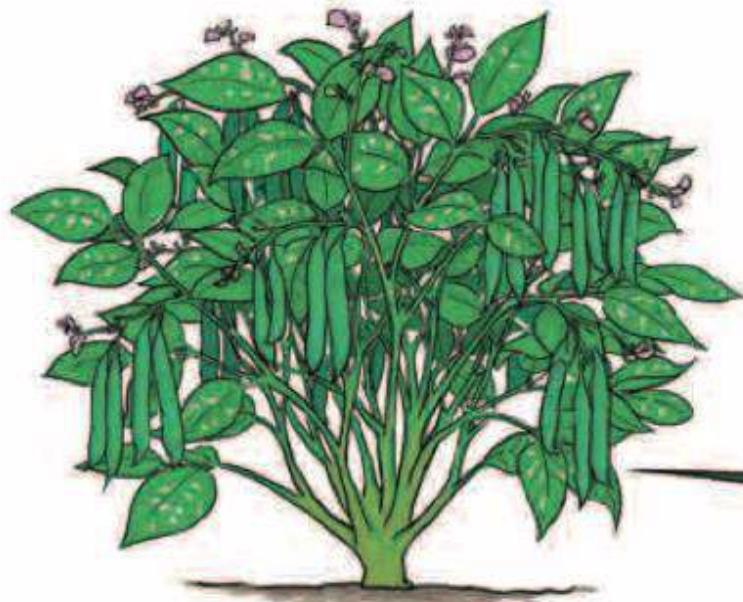
Anthrac

Angular leaf Spot (fungal)



- Early symptoms of angular leaf spot
- Will later develop to affect pods
- Treat seed with a fungicide, or early application of a fungicide if detected early

ALS

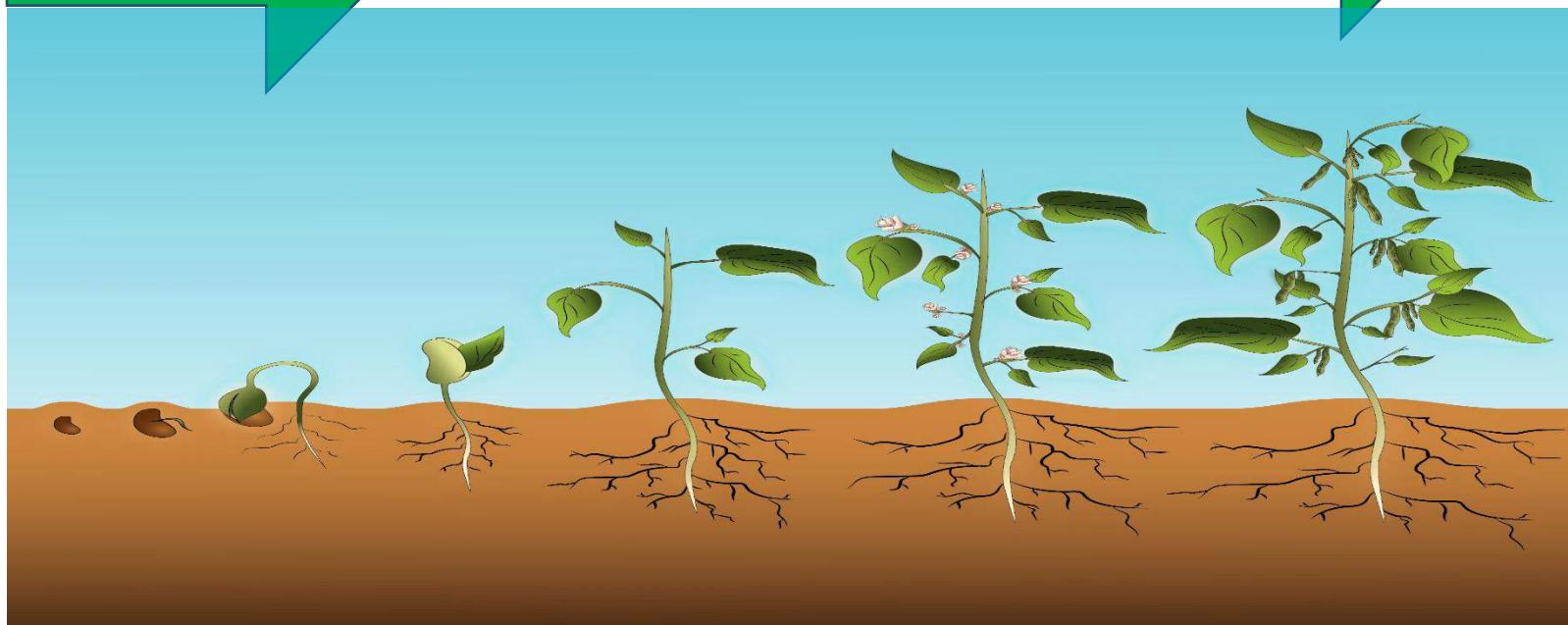


Angular leaf spot

Diseases and remedies

Fusarium,
Phytophthora &
Pythium root rot

Angular leaf spot, Anthracnose, Common blight, Halo
blight, Rust & Bean Common Mosaic Virus



Seed dressing

Thiram , Apron XL,
Maxim XL, Vitavax

Foliar spray

Tilt, Shavit, Ridomil Gold, Opera, Chlorothalonil,
Propiconazole+ Trifloxystrobin, Folicur, Bravo,
Tolerant Varieties

Safe use of chemicals

- Use only herbicides, pesticides and fungicides that are recommended to sugar bean to avoid damage to the plant.
- Chemicals can be toxic, so always follow instructions on the product package or from the agro-dealer for safe use.
- Also follow the instructions about the time needed between spraying and safe consumption of fresh pods.
- Wear protective clothing when this is recommended.
- Do not store chemicals in the same place as food.
- Do not eat from the same spoon you used to measure chemicals.



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Sprayer Use

- Type and size of nozzle
- Spray volume/ha- around 200l/Ha
- Walking speed-recommended speed is 0.9m/second to 1.25m/second (average 1m/second)
- Lance height-75-80cm above ground
- Chemical application rate-always refer to the chemical label
- Spray tank capacity e.g. 10l, 15, 16l knapsack or 500l, 2500l boom sprayer tank



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Knapsack Use

Calculating the amount of chemical required per spray volume capacity

- The next step is to determine the amount of chemical to be mixed in a 15 l knapsack sprayer.
- If a spray volume of 200l is required per Ha, then it means 13 knapsacks are enough to cover 1 Ha, from the following calculation;

$$\frac{200}{15} = 13.3 \text{ knapsacks to pray 1Ha}$$

- With a herbicide rate of 1.5l/Ha or 1.5l per 200l of water, it means;

$$\frac{1500\text{ml}}{13}$$

= **115.0ml** of herbicide is required in a knapsack with 15l water



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- Some farmers prefer to do the mixing say in a non-corrosive (preferably plastic) 200l drum, then transfer the mixture in knapsack ready for spraying.
- But always remember to agitate or stir the mixture with a clean stick before loading the knapsack.



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Harvesting

- Start harvesting when the leaves and pods are dry and yellow-brown. Harvesting indices
- Sugar bean reaches physiological maturity when moisture is 50%
- Harvest when moisture is 16% and dry to 9% on the sun
- Harvest by handpicking dry pods or by cutting the plants at ground level using a sickle or pulling by hand. Leave the roots on farm to improve soil fertility.
- Dry the pods or the plants with pods in the sun on a clean surface like a plastic sheet or tarpaulin, on a slab, or on a raised solid platform. Dry for about one day. Do not dry the pods on the soil.
- Gently thresh the pods or plants with pods on a clean surface but avoid splits .
- Dry the threshed grains on a clean surface for two sunny days; protect from rain and animals.



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Harvesting

- Test the grain to see if it is dry enough by biting or pinching grain with your finger nails - grain should break or crack, not bend or stick between your teeth or fingernails.
- Acceptable moisture for storage and marketing is 9%
- Clean the grains. Winnow to remove chaff, dust and other rubbish. Also remove shrivelled, diseased, broken grains (splits) and grains of other varieties/crops/weeds



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