

## II. GROUNDNUT

### 1. INTRODUCTION:

Groundnut is the most important edible oilseed crop of Andhra Pradesh in terms of acreage and economy. During 2014-15, the crop was cultivated in 8.74 lakh hectares with a production of 5.64 lakh tones. The productivity in Andhra Pradesh during 2014-15 was 493 kg/ha.

The Groundnut will continue to remain a very important vegetable oil; however, its prime place among the crops for vegetable oil may not remain assured in future, given the competition from other conventional and non-conventional sources of oil. But a very good opportunity remains to tap the potential for using Groundnut for food, nutrition, feed, fodder and export.

### 2. VARIETAL RECOMMENDATION:

Condition	Suitable Varieties	Duration (Days)	
		Kharif	Rabi
a) For Scarce Rainfall areas	Kadiri-9, Kadiri Harithandhra, Anantha, Kadiri-6, Narayani, Dharani & ICGV-91114,	105- 110	110-120
b) For excess rainfall conditions	Kadiri-7Bold & Kadiri-8Bold,	125 – 130	125-140
	Abhaya, Kadiri-9 and Dharani	105 – 110	115-120
c) For assured rainfall areas with supplementary irrigations	Kadiri-7 Bold, Kadiri-8Bold , Abhaya	125 – 130	125-140
	kadiri-6 Kadiri-9, Kadiri Harithandra, Greeshma, Abhaya, Narayani, Rohini, ICGV-91114, Dharani, Kadiri Anantha	105 – 110	115-120
d) Varieties having tolerance to leaf spot	Kadiri-9, KadiriHarithandra ,Greeshma, Kadiri Anantha, Abhaya, Dharani	105 – 110	115-120
e) Nematode infected Areas	Kalahasti , Prasuna, Kadiri-9	100 - 105	110-115

f) For delayed Monsoons	Kadiri-9, Kadiri Ananthav&vKadiri Harithandra	90-100 105-110	100-110
g) Varieties having drought tolerance	Kadiri-9, Anantha, Abhaya, ICGV-91114, Dharani	105 – 110	115-120
h) For rice fallow conditions	Kadiri-6, Greeshma, Kadiri Harithandra, TAG-24, Rohini, Dharani	100 – 105	100-110
i) Coastal sands	Kadiri-6, Greeshma, TAG-24 & Narayani, Dharani, Rohini, Greeshma	95-100	100-110

### 3. LAND PREPARATION:

- ❖ Prepare the land till fine tilth is attained.
- ❖ It facilitates root growth, peg penetration and pod development.
- ❖ Weeds and clods are to be avoided.

### 4. SEED RATE: Depends on variety and season

Varieties	Seasons	
	Kharif	Rabi
Narayani, Kadiri-6	150kg. Kernel/ha	180kg Kernel/ha
Kadiri-7Bold, Kadiri-8Bold, Abhaya, Kadiri-9, ICGV 91114, Kadiri Harithandra, Greeshma and Kadiri Anantha, Dharani	125 kg. Kernel/ha	150kg. Kernel/ha

- With traditional sowing 2 ha of area can be covered in a day while, with tractor drawn seed drill an area of 5-6 ha can be covered.
- 25 Kg of seed per hectare can be saved due to tractor drawn seed planters compared to traditional method behind the plough or bullock drawn gorru sowing.
- Hence, sowing with tractor drawn seed drill will reduce the seed and sowing cost .

### 5. SPACING:

Varieties	Seasons	
	Kharif	Rabi
<b>Spanish Bunch Varieties</b> Kadiri-6, Narayani, ICGV-91114, Kadiri Harithandra, Greeshma, Kadiri-9, Rohini and Kadiri Ananta, Dharani	30 x 10 cm	22.5 x 10cm
<b>Virginia Bunch Varieties</b> Kadiri-7Bold, Kadiri-8Bold	30 x 15 cm	22.5 x 15 cm

### 6. SEED TREATMENT:

- ❖ Seed should be treated with Imidachloprid @ 2 ml / kg seed followed by Tebuconazole 2DS @ 1g or Mancozeb @ 3 g / kg seed.
- ❖ If the seed is dormant, soak it in 0.05 % Ethrel solution for 12 hours followed by shade drying or mix 1.25 ml. Ethophon in 5 lt. water and spray on 100kg. seed 12 hours before sowing in air tight bag.
- ❖ *Trichoderma viride* seed treatment @ 4 g/kg seed for rot prone areas
- ❖ *Rhizobium* inoculation is necessary for groundnut in non-traditional areas and rice fallows.

### 7. SOWING TIME:

Area	Kharif	Rabi
North coastal Andhra	First fortnight of June to last week of June	First FN of November to first FN of December
Rayalaseema	First fortnight of July to 1 <sup>st</sup> FN of August	First FN of November to first FN of December

### 8. FERTILIZER RECOMMENDATIONS:

- ❖ Application of farm yard manure/ compost @ 10 tonnes /ha once in 2 - 3 seasons
- ❖ NPK recommendations should be on soil test basis
- ❖ Apply 20N + 40 P<sub>2</sub>O<sub>5</sub> + 50 K<sub>2</sub>O kg/ha as basal for kharif crop. Phosphorus should be applied through single super phosphate.
- ❖ For rabi apply 20N + 40 P<sub>2</sub>O<sub>5</sub> + 50 K<sub>2</sub>O kg/ha as basal and 10N kg/ha at flowering
- ❖ Apply Gypsum @ 500 kg /ha at flowering stage by placement.
- ❖ Wherever Zinc deficiency is observed, apply Zinc sulphate 50 kg/ha. once in 3 seasons.
- ❖ Wherever Iron deficiency is noticed on crop, spray 0.5 % ferrous sulphate along with 0.1 % citric acid two times with one week interval.
- ❖ Seed treatment with Rhizobium and soil application of Phosphorous Solubilising Bacteria will reduce the chemical fertilizers requirement.
- ❖ Apply 50 kg Zinc Sulphate, 10 kg Borax & 10 kg Ferrous sulphate per hectare as basal to avoid deficiency.

### 9. WEED MANAGEMENT:

- ❖ Crop must be weed free up to 45 days after sowing.
- ❖ Intercultivation at 20 and 40 DAS followed by one hand weeding.
- ❖ The crop should not be disturbed by weeding or intercultivation after 45 DAS.
- ❖ Preplanting application of Fluchloralin @ 2.5 to 3 l. / ha.
- ❖ Pre-emergence application of Butachlor /Metalachlore/ Pendimethalin @ 2.5 to 3 l/ ha. or Oxyflourfen @ 1.5 to 2.0 l./ha followed by one intercultivation and one hand weeding will effectively control the weeds.
- ❖ Wherever, pre-emergence herbicides could not apply, weeds can be controlled by post-emergence herbicides by spraying Imazethaphyr @ 750 ml/ha or Quízalofop ethyl @ 1.0 l/ha for monocots at 20 DAS when the weeds are at 2 leaved stage.
- ❖ In heavy soil higher dose of chemical should be used.

### 10. IRRIGATION MANAGEMENT:

- ❖ Groundnut crop requires on an average 400 to 450 mm depth of water.
- ❖ Good crop of groundnut requires 8 to 9 irrigations at 10 day interval starting from 25 DAS.
- ❖ After the crop is established, it is necessary to withhold irrigation for about 25 days to create stress which helps in synchronization of flowering.
- ❖ The last irrigation is to be at 90 days after sowing.
- ❖ About 24-30 % irrigation water can be saved due to use of sprinklers.

Soil moisture conservation practices should be followed in rainfed crop viz.,

- ❖ Apply 12.5 tonnes of groundnut shells per hectare at 15-20 DAS as mulch to reduce evaporation losses of soil moisture.
- ❖ To reduce transpiration losses from crop canopy, spray calcium sulphate solution (50 g/l).
- ❖ Spray urea solution (20 g/l) during dry spell period in order to make recover the crop from stress.

**Critical stages for water requirement:** Flowering, peg penetration and pod development.

## 11. PEST MANAGEMENT:

### A. Insect Pest management:

#### 1. Red hairy caterpillar:

##### Identification:

- ❖ Young larvae feed gregariously on the undersurface of leaves.
- ❖ Grown up larvae feed individually by devouring leaves, flowers and growing points.
- ❖ When the pest is severe only the bare stem points remain resulting in heavy yield loss.
- ❖ Early instar larvae are ash brown in color, but when fully grown assume reddish brown with black color hairs on the body.

**Problem areas:** Srikakulam, Visakhapatnam, Kadapa, Kurnool, Anantapuramu and Chittoor districts.

##### Remedies:

- ❖ Pre-monsoon deep ploughing (two/three times) will expose the hibernating pupae to sunlight and predatory birds.
- ❖ Removal and destruction of alternate wild hosts which harbour the hairy caterpillars.
- ❖ Use trap crops around main crop Eg. Cowpea.
- ❖ Collect the grown up larva by keeping calotropis branches between the rows.
- ❖ Monitor the emergence of adult moths through light trap.
- ❖ Organize bonfires on community basis from 7.30 PM to 11.0 PM to attract the newly emerging moths for 3 or 4 succeeding days when good showers are received.
- ❖ Collect and destroy egg masses and early instars larvae.
- ❖ Dust Quinolphos or Carbaryl @ 25 kg /ha to control early instars of the caterpillar.
- ❖ To control grown up larvae, spray Dimethoate @ 2.0 ml or Monocrotophos 1.6 ml/l of water.
- ❖ Trap and kill the migrating larvae in deep cut straight trenches by dusting Methyl parathion 2% in the trench around the field.

#### 2. Root grub: Identification:

- ❖ Young grubs feed on rootlets and nodules.
- ❖ Old grubs devour the entire taproot.
- ❖ Affected plants wither and die. Such plants when pulled from the soil, the devoured taproot can be clearly seen.
- ❖ Damage usually occurs in patches.
- ❖ Pest usually occurs in August and September months.

**Distribution:** Anantapuramu, Kadapa, Kurnool, and Chittoor districts.

##### Remedies:

- ❖ Pre-monsoon deep ploughing (two/three times) will expose the hibernating pupae to sunlight and predatory birds.
- ❖ Mass collection and distribution of beetles from the branches of neem, bar, drumstick and subabul trees.

- ❖ Apply 10 G Phorate granules @ 1.5 kg a.i. /ha at the time of sowing.
- ❖ Seed treatment with chlorpyrifos @ 6 ml /kg in root grub problem fields or Imidachloprid 2ml/kg seed or Chlothianidin 50 WDG @ 1g/kg seed.

### 3. Leaf miner: Identification:

- ❖ Small blister like mines appear initially on the upper surface of the leaf.
- ❖ At severe stages entire leaflet becomes brown and it rolls, shrivels and dries up.
- ❖ Severely infected crop may die and give burnt appearance in the field when we see from distance.

**Problem areas:** Presently it is a major pest in all parts of the state.

#### Remedies:

- ❖ Rotation of groundnut with non-leguminous crops should be followed to reduce the pest incidence.
- ❖ Rotation of groundnut with soybean should be avoided.
- ❖ Collection and destruction of moths by setting light traps early in the season.
- ❖ Keeping pheromone traps in the field @ 10 per acre.
- ❖ Spraying of Quinolphos 2.0 ml or Monocrotophos 1.6 ml/l of water should be followed.

### 4. Tobacco caterpillar (*Spodoptera litura*)

#### Identification

- ❖ Larvae long, Stout, pale green (or) brown with black half moon shaped spots on the body
- ❖ During daytime it hides under soil clods and stores..
- ❖ Eggs are small and in masses, covered with yellow tufted hairs.
- ❖ In initial stages larvae congregate and scrapes later skeletonises on the leaves.
- ❖ Leaves become white papery at early stage.
- ❖ In severe cases it defoliates.
- ❖ Grown up larvae disburses and make irregular holes

#### Problem Areas

All groundnut areas (Anantapuramu, Cuddapah, Chittoor).  
Severe in the months of September, October and November.

#### Remedies

- ❖ Monitor the pest from September last week onwards by Pheromone traps @ 10 per ha.
- ❖ Collection and destruction of eggs masses and damaged leaves along with gregarious larvae.
- ❖ Grow the castor plants in the field at the time of sowing act as trap crop.
- ❖ For early stages spray neem oil 5ml or Chlorpyrifos 2.5 ml or Monocrotophos 1.6 ml per liter of water.
- ❖ Arrange bird perches @ 25 per ha.
- ❖ Spray *SLNPV* @ 500 LE/ha @ 1 kg / 70 meters.
- ❖ Make deep furrow around the field and dust with methyl parathion or Endosulfan dust to control migratory caterpillars
- ❖ For late instar (3<sup>rd</sup> onwards) larvae spray Thiodicarb 1.0 g or Novaluron 1.0 ml or Chlorfenpyr 2.0 ml/l. of water
- ❖ Use poison bait to attract and to control late instar larvae per hectare

Rice bran	-	12.5 kg
Jaggery	-	1.25 kg
Carbaryl	-	1.25 kg (or)
Monocrotophos	-	1.25 litres (or)
Methomyl	-	0.75 kg

- Water - 10-12 litres
- ❖ Mix the above and make small pellets and apply them in one hectare, during evening hours near base of plants.

### 5. Sucking pests (Jassids, Aphids and Thrips):

#### Identification:

- ❖ Jassid infestation results in yellowing of the leaves at early stage and later turn brick red.
- ❖ Thrips infestation results in curling of leaves and stunting of the plant.
- ❖ Aphid infestation results in chlorotic plants and curling of leaves.
- ❖ Aphids transmit Rosette, Thrips transmit Carried Bud necrosis and PSND diseases in groundnut.

**Distribution:** Present in all groundnut growing areas.

**Remedies:** Spraying of Monocrotophos 1.6 ml or dimethoate 2.0 ml or Imidachloprid @ 0.2 ml /lit of water.

### 6. Storage Pests:

- ❖ Groundnut bruchid and Corcyra which occurs in storage.
- ❖ Maintain minimum moisture percentage (9 %) in pods during storage.
- ❖ Spray 5% Malathion on pod and gunny bags.
- ❖ Fumigation with aluminium phosphide tablets 3-5 tablets /tonne of groundnut pods.
- ❖ Mixing neem oil 5 ml/kg of pods protect from bruchid.

## B. DISEASE MANAGEMENT:

### 1. Tikka leaf spot

#### Identification:

- In case of early leaf spot, the lesions are sub circular and 1-10 mm diameter and dark brown on the upper surface of the leaf
- In case of late leaf spot, the lesions on the leaf are small, more nearly circular and darker than those of early leaf spot.
- Both the lesions may also appear on the stem, petiole and pegs

**Problem areas:** Both the leaf spots are commonly present in all groundnut-growing areas, but, the incidence is relatively more in North coastal and heavy rainfall areas.

#### Remedies:

- Removal of infected plant debris
- Crop rotation should be followed
- Seed treatment with Tebuconazole 2DS @ 1g or mancozeb @ 3 g/kg of seed
- Growing tolerant varieties viz., Vemana, Kadiri Harithandra, JCG-88, Abhaya and Kadiri 7 bold, Kadiri-9
- Spraying of mancozeb @ 1000 g + Carbendazim @ 500 g /ha or Hexaconazole @ 1000 ml or Chlorothalonil @ 1000 g or Tebuconazole @ 500 ml/ha in 500 liter of water at fortnightly intervals from first disease appearance.

### 2. Rust:

#### Identification:

- Orange coloured pustules appear on the lower surface of the leaflets
- In severe cases, lesions also appear on other plant parts except flowers

**Problem areas:** Occurs in all groundnut-growing areas

**Problem Areas:** Anantapur, Mahaboobnagar, Kurnool and Chittoor districts of A.P.

**Remedies:**

- Seed treatment with Imidachloprid @ 2 ml/Kg of seed
- Weeds such as *Parthenium hysterophorus*, *Tridax procumbence*, *Ageratum conyzoides*, *Cleome viscosa*, *Commelina benghalensis*, *Vernonia cineraria*, *Achyranthus aspera*, *Acanthospermum hispidum*. should be removed before flowering in and around the field
- Barrier crops namely bajra, maize and sorghum should be planted in 4-8 rows around the groundnut field. These will prevent thrips and borne weed pollen carrying virus
- Spraying of monocrotophos @ 800 ml or Dimethoate @ 1000 ml or Imidachloprid @ 200 ml/ha in 500 liters of water at 25-30 days after sowing

**6. Peanut bud necrosis disease:**

**Identification:**

- Initial symptoms appear on young leaflets as chlorotic spots and develop in to chlorotic or necrotic ring spots
- Terminal bud necrosis on main stem followed by death of top buds on all primaries
- Stunting growth with reduced size of leaflets and petioles
- Leaflets produced on auxiliary shoot showed reduction in size, distortion of lamina and mosaic symptoms.

**Remedies:**

- Use of tolerant varieties viz., R-8808, ICGS-11, 44
- Intercropping with bajra (7:1)
- Spraying of monocrotophos @ 800 ml or Dimethoate @ 1000 ml or Imidachloprid @ 200 ml/ha in 500 liters of water at 25-30 days after sowing
- Maintenance of recommended plant population (44 plants/sq.m)
- Grow inter crop with bajra/ sorghum/ maize in the ratio of 7:1 or 11:1

**12. HARVESTING:**

- ❖ Should be done at right stage of maturity
- ❖ At the time of 70-80% leaves and stems turn yellow
- ❖ When the inner side of the shell turn black
- ❖ When sufficient moisture is available in the root zone

**13. STORAGE:**

- ❖ Seed should not contain more than 9% moisture for storage
- ❖ Prefer poly ethylene/gunny bags for storage
- ❖ Spray Malathion 5 ml / liter of water once in 2-3 weeks on storage bags against storage pests.

**14. TIPS FOR INCREASING PRODUCTION**

- ❖ Deep summer ploughing
- ❖ Adoption of quality seed of HYV
- ❖ Adoption of recommended seed rate
- ❖ Use small seed with out shrivelling of improved varieties
- ❖ Seed treatment
- ❖ Ensure optimum population
- ❖ Adopt recommended fertilizer dose
- ❖ Adoption of Ferti-cum- seed drill to ensure right placement of seed and fertilizer

- ❖ Apply Gypsum and SSP to provide calcium and Sulphur
- ❖ Avoid inter cultivation/weeding after 45 DAS.
- ❖ Adopt IPM Package
- ❖ Practice crop rotation and intercropping
- ❖ Use mechanization for sowing, inter cultivation ,harvesting and stripping to reduce cost of cultivation