

# **JUNAGADH AGRICULTURAL UNIVERSITY, JUNAGADH**

## **RESEARCH RECOMMENDATIONS FOR SCIENTIFIC COMMUNITY**

### **III. PLANT PROTECTION**

Fifty two scientific recommendations developed by plant protection disciplines are described below.

#### **Agricultural Entomology**

**Year: 2004-05**

##### **Castor**

The castor genotypes having the plant characters of double bloom and triple bloom were found resistant against jassid and they gave the lowest jassid population and higher seed yield than the genotypes having the plant characters of no bloom and single bloom. Whereas, the castor genotypes having the plant characters of no bloom and single bloom were found resistant against whitefly and thrips and they gave the lowest pest population than the genotypes having the plant characters of double bloom and triple bloom. So, these genotypes are recommended to be utilized in breeding programme for pest resistance.

(Main Oilseed Research Station, JAU, Junagadh)

##### **Forage Sorghum**

In forage sorghum, plant damage by shoot fly was in the range of 3.3 per cent at 28 DAG (Days After Germination) to 5.0 per cent at 21 DAG. Whereas, due to stem borer plant damage was 12.90 per cent at 48 DAG, leaf damage score was 2.7 at 44 DAG and stem tunneling was 8.3 per cent at harvest time.

(Grassland Research Station, JAU, Dhari)

**Year: 2005-06**

##### **Sesame**

Avoidable yield loss in sesame due to infestation of leaf roller (*Antigastra catalaunalis*) ranged between 8 to 34 per cent with an average of 16 per cent.

(Dry farming Research Station, JAU, Targhadia)

##### **Sesame**

Yield loss in sesame (G. Til-2) due to pest complex i.e. leaf webber (*Antigastra catalaunalis*), gall fly (*Asphondylia sesami*), mite (*Polyphagotarsonemus latus*) and leaf eating beetle (*Pucneforus impressus*) was 38.70 per cent.

(Agriculture Research Station, JAU, Amreli)

##### **Sesame**

Sesame genotypes/varieties, G.Til-10 and NG-2-177 were tolerant to leaf webber/capsule borer (*Antigastra catalaunalis*). Entries G.Til-10, NG-2-177, AT-103 and AT-93 were tolerant to gall fly (*Asphondylia sesami*). Entry AT-93 was tolerant to mite (*Polyphagotarsonemus latus*).

(Agriculture Research Station, JAU, Amreli)

##### **Cabbage & Cauliflower**

The population of aphid (*Brevicoryne brassicae*) and whitefly (*Bemisia tabaci*) in cabbage and cauliflower were maximum during early January to early February under Junagadh condition. The diamond back moth (*Plutella xylostella*) infestation initiated in early January and reached at peak in early February. The population of aphid and whitefly were negatively correlated with maximum temperature in cabbage, while the DBM population in both the crops was positively correlated with wind speed.

(Department of Entomology, CoA, JAU, Junagadh)

**Year: 2007-08**

##### **Pearl Millet**

In pearl millet, incidence of shoot fly *Atherigona approximate* (Malloch) started at seedling stage and remained up to earhead stage. It was non-significantly and positively correlated with maximum and minimum temperatures and the difference of temperature, while negatively with remaining parameters. Incidence of stem borer *Chilo partellus* (Swinhoe) started from early crop

stage. Comparatively higher dead heart per cent was noticed at pre flowering and earhead stages. Maximum temperature and the difference of temperature exhibited significantly negative correlation with stem borer incidence, while remaining weather parameters showed significant positive correlation. Incidence of *Helicoverpa armigera* (Hub.) (Earhead worm) started at earhead emergence was higher at 63 days after germination (DAG) and decreased towards maturity. Its correlation was found significantly positive with minimum temperature and negative with rainy days.

(Main Pearl Millet Research Station, JAU, Jamnagar)

### Groundnut

The coccinellid *Menochilus sexmaculatus* (F.) was the major predator of aphid, *Aphis craccivora* Koch on groundnut crop. The predator commenced one week later than the aphid (Prey) which multiplied very fast and reached at peak in 31<sup>st</sup> standard week. There was highly significant and positive correlation between population of the predator and the aphid on groundnut crop. The pest to predator ratio was 33:1 (aphid/twig: coccinellid/plant).

(Main Dry farming Research Station, JAU, Targhadia)

### Year: 2011-12

#### Testing bio efficacy of insecticides through seed treatment against sucking pests of summer groundnut

Seed treatment with imidacloprid 600 FS @ 2 ml/kg seed gave effective control of jassids and thrips in summer groundnut up to 35 day after sowing.

(Main Oil Seed Research Station, JAU, Junagadh)

#### Monitoring of fruit flies in mango orchard through methyl eugenol trap

In mango orchards of South Saurashtra Agro-climatic Zone, the population of fruit fly (*Bactocera dorsalis* Hendel) males was maximum during April to September (14<sup>th</sup> to 36<sup>th</sup> Met. Standard week). Its activity was related positively with high humidity (80 to 90%) and 24 to 26 °C minimum temperature.

(Department of Entomology, CoA, JAU, Junagadh)

#### Monitoring of fruit flies in mango orchard through methyl eugenol trap

In mango orchards of North Saurashtra Agro-climatic Zone, the population of fruit fly (*Bactocera dorsalis* Hendel) males was maximum during 1<sup>st</sup> week of April to last week of July (13<sup>th</sup> to 31<sup>th</sup> Met. Standard week). Its activity was related positively with maximum (32 to 42 °C) and minimum (21 to 27 °C) temperature and relative humidity (63 to 89%).



(Grassland Research Station, JAU, Dhari)

#### Monitoring of pod borer by pheromone trap in chickpea

The population of gram pod borer (*Helicoverpa armigera* Hub.) males was observed throughout the crop period except severe winter month, with maximum activity in 3<sup>rd</sup> Met. Standard week. Its activity was related negatively with maximum and minimum temperature and mean evaporation.

(Grassland Research Station, JAU, Dhari)

#### Population dynamics of shoot fly and stem borer in forage sorghum in relation to abiotic factors

The sorghum shoot fly (*Atherigona soccata*) and stem borer (*Chilo partellus*) in *kharif* forage sorghum were active during 14 to 21 DAG and 45 DAG, respectively. Weather parameters did not show any effect on damage caused by both the pests; however, afternoon relative humidity caused negative effect on the damage caused by shoot fly.

(Grassland Research Station, JAU, Dhari)

### **Year: 2012-13**

#### **Evaluation of different chickpea varieties to bruchid (*Challosobruchus chinensis* L.) damage in storage**

Varieties of chickpea viz., Chaffa, ICCL 86111, GG 4 and Dahod Yellow were found comparatively less susceptible and Phule G 0517 and PKV 4 as more susceptible to bruchid in stored chickpea.

White colour, smooth surface, large and very large seeded varieties (>22 g/100 seed weight) of chickpea were found more preferred for oviposition to bruchid, whereas white colour, large and very large seeded varieties (>22 g/100 seed weight) were found more preferred for development. Numbers of eggs and adult emergence have significant positive correlation with 100 seed weight and seed damage.

(Pulse Research Station, JAU, Junagadh)

### **Year: 2014-15**

#### **Management of sucking pests through insecticides in brinjal**

Three sprays of bifenthrin 10 EC, 0.02 %, 20 ml /10 litre water or buprofezin 25 SC, 0.06 %, 24 ml/10 litre of water at 15 days interval starting from the pest infestation found effective for the control of brinjal whitefly.

The PHI for bifenthrin 10 EC, 0.02 % and buprofezin 25 SC, 0.06 % is 1 and 7 days, respectively.

(Department of Entomology, CoA, JAU, Junagadh)

#### **Population dynamics of important pests of mango**

The incidence of mango hopper, thrips and flower bug was found high during December to February while, leaf gall midge and shoot borer were found active during September to October.

(Department of Entomology, CoA, JAU, Junagadh)

#### **Population dynamics of important pests of pomegranate**

Anar butterfly was found high during November to May while, thrips was found active during August to November in pomegranate.

(Department of Entomology, CoA, JAU, Junagadh)

#### **Testing of efficacy of different newer insecticides against shoot fly and stem borer in pearl millet**

Seed treatment with imidacloprid 600 FS @ 8.75 ml/kg, 4.20 g a.i./kg at the time of sowing followed by spray with spinosad 45 SC, 0.009 % @ 2.0 ml/10 litre at 35 days after germination of the crop found effective for the management of shoot fly and stem borer. The PHI for these insecticides is 42 days.

(Pearl millet Research Station, JAU, Jamnagar)

#### **Incidence of insect pests of chickpea through the cropping period and monitoring of pod borer moths using pheromone traps**

Normal and late sowing of chickpea varieties showed sustainable population of *Helicoverpa armigera* at 60 days after sowing.

(Pulses Research Station, JAU, Junagadh)

### **Year: 2015-16**

#### **Field efficacy of newer insecticides against sucking pests of cumin**

Spray of imidacloprid 17.8 SL 0.004% (2.24 ml/10 lit water) or spinosad 45% SC 0.009% (2.0 ml/10 lit water) or acetamiprid 20% SP 0.004% (2.0 g/10 l water) at the appearance of pests was found effective and economical for control of aphids and thrips in cumin.

Residue was not detected in cumin at harvest of imidacloprid 17.8 SL 0.004% or spinosad 45% SC 0.009% or acetamiprid 20% SP 0.004%.

(Department of Entomology, CoA, JAU, Junagadh)

#### **Management of sucking pests through seed treatments in cluster bean**

Seed treatment with imidacloprid 600 FS @ 10 ml/kg seed or thiamethoxam 30 FS @ 10 ml/kg seed found effective and economical for control of whitefly of cluster bean var. Pusa Navbahar.

(Department of Entomology, CoA, JAU, Junagadh)

### Field efficacy of newer insecticides against inflorescence pests of mango

For effective management of inflorescence pests of mango viz., hopper, thrips and flower bug, two sprays of spinosad 45 % SC 0.018% (4 ml/10 lit water) or carbosulfan 25 % EC 0.05% (20 ml/10 lit water) or acetamiprid 20 % SP 0.01% (5 g/10 lit water) at 15 days interval starting from pests infestation were found effective.

(Department of Entomology, CoA, JAU, Junagadh)

### Survey of various pests in mango orchard

The incidence of leaf gall midge, mango hopper, shoot borer and thrips were found enormously during the month of September to October, January to March, July to September and August to December, respectively.

Maximum population of leaf gall midge and mango hopper was noticed in Chalala and Mendarda area, while shoot borer and thrips were found maximum in Talala area of Saurashtra region.

(Department of Entomology, CoA, JAU, Junagadh)

### Year: 2016-17

### Field efficacy of different insecticides against citrus pests

Two sprays of spinosad 45 SC 0.0135 % (3 ml/10 lit. water) and difenthiuron 50 WP 0.05 % (10 ml/10 lit. water) at 15 days interval starting from pests infestation was found effective for management of leaf miner and black fly in South Saurashtra Agro-climatic Zone.

(Department of Entomology, CoA, JAU, Junagadh)

### Survey of various insect-pests of pomegranate in Saurashtra region

The incidence of anar butterfly and thrips were found enormous during the month of January to April and September to December, respectively. The maximum population of anar butterfly was noticed in Junagadh region, while thrips was found maximum in Kalawad area.



(Department of Entomology, CoA, JAU, Junagadh)

### Evaluation of some newer insecticides against the leaf weber, *Antigastra catalaunalis* (Duponchal) infesting sesame under rainfed condition

Two sprays of insecticides i.e. indoxacarb 14.5 SC 0.007 % (4 ml/10 lit. water) or spinosad 45 SC 0.009 % (2 ml/ 10 lit. water) or emamectin benzoate 5 SG 0.002 % (4 g/10 lit water) or profenophos 50 EC 0.005 % (10 ml/ 10 lit. water) or chlorantraniliprole 20 EC 0.006 % (3 ml/ 10 lit water) (first at ETL of the pest 5 larvae/ 20 plant and second at 15 days after first spray) found effective for management of sesame leaf weber in North Saurashtra Agro-climatic Zone. There was no problem of residue of all the insecticides in sesame seeds at 30 days after second (last) spray application.



(Main Dry Farming Research Station, JAU, Targhadia)

### Initiation and development of aphid and jassid in relation to different weather parameters on groundnut crop under rainfed condition

The incidence of thrips on groundnut was commenced in 26<sup>th</sup> SW (Stander Week) and reached to a peak in 33<sup>rd</sup> SW. The influence of wind speed was found significant on thrips population, while, other abiotic factors have no significant effect. All the abiotic factors had non-significant effect on aphid and jassid population in groundnut.

(Main Dry Farming Research Station, JAU, Targhadia)



### **Testing of insecticides against major pests of sesame**

Two sprays of lambda cyhalothrin 5 EC 0.005 % (10 ml/10 lit. water) or emamectin benzoate 5 SG 0.0035 % (7 g/10 lit. water) (1<sup>st</sup> spray at ETL of 0.25 larva/plant and 2<sup>nd</sup> spray at 15 days after 1<sup>st</sup> spray) found effective and economic for management of leaf webber of sesame in *kharif* in North Saurashtra Agro-climatic Zone.

Two sprays of dicofol 18.5 EC 0.037 % (20 ml /10 lit. water), 1<sup>st</sup> spray at appearance of mite and 2<sup>nd</sup> spray at 15 days after 1<sup>st</sup> spray found effective and economical. Residues of above pesticides in sesame seed were not detected at 30 days after 2<sup>nd</sup> spray.

(Agricultural Research Station, JAU, Amreli)

### **Evaluation of botanicals, bio-pesticides and insecticides against gram pod borer**

Two spray of profenofos 50 EC 0.13 % (26 ml/10 lit. water) and chlorantraniliprole 18.5 SC 0.004 % (2 ml/10 lit. water) were found effective and economic management of pod borer (*Helicoverpa armigera*) in chickpea crop. First spray should be started at 50 % flowering and second at 15 days after first spray. The PHI for chlorantraniliprole 18.5 SC and profenofos 50 EC are 11 and 27 days, respectively.

(Pulse Research Station, JAU, Junagadh)

### **Bioefficacy of different insecticides against castor shoot and capsule borer**

Two sprays of spinosad 45 SC 0.009 % (2 ml/10 lit. water) or chlorantraniliprole 18.5 SC 0.006 % (3.2 ml/10 lit. water) at 15 days interval starting from pest infestation found effective and economical for the management of castor shoot and capsule borer.

(Department of Entomology, CoA, JAU, Junagadh)

### **Year: 2017-18**

### **Bio-efficacy of different bio-pesticides and insecticides against pink bollworm in Bt cotton (Bollgard-II)**

For effective and economical management of pink bollworm, five spray of spinosad 45 SC 0.014 % (3.0 ml/10 litre of water) or chlorantraniliprole 18.5 SC 0.006 % (3.0 ml/10 litre of water), first spray at 5 % appearance of rosette flower and subsequent four spray at 10 days interval after first spray found effective in cotton.

(Department of Entomology, CoA, JAU, Junagadh)

### **Management of *Helicoverpa armigera* (Hubner) and *Spodoptera litura* (Fabricius) in groundnut through insecticides**

For effective and economical management of *Helicoverpa armigera* (Hubner) and *Spodoptera litura* (Fabricius), three spray of indoxacarb 14.5 SC 0.007 % (5.0 ml/10 litre of water) or spinosad 45 SC 0.014 % (3.0 ml/10 litre of water) or chlorantraniliprole 18.5 SC 0.006 % (3.0 ml/10 litre of water), first spray at the initiation of pest infestation and subsequent sprays at 15 days interval after first spray found effective in *kharif* groundnut.

(Department of Entomology, CoA, JAU, Junagadh)

### **Management of ear head worm, *Helicoverpa armigera* (Hub.) infesting bajra crop with bio-pesticides**

Spray of DDVP 76 EC @ 0.05 % was found effective and economical for the management of ear head worm, *Helicoverpa armigera* (Hub) in pearl millet at ear head stage.

(Main Pearl Millet Research Station, JAU, Jamnagar)

### **Testing bio-efficacy of insecticides against leaf webber *Crociodomia binotalis* Zell) of mustard**

The scientific community is informed to apply two spray of ready mixture of profenophos 40 % + cypermethrin 4 %, 44 EC 0.044 % 220 g a.i./ha (10 ml/10 litre of water) or profenophos 50 EC 0.05 % 250 g a.i./ha (10 ml/10 litre of water) or novaluron 10 EC 0.005 % 25 g a.i./ha (5 ml/10 litre of water) at 7 days interval starting from pest infestation for effective and economical management of mustard leaf webber.

(Main Oilseeds Research Station, JAU, Junagadh)

## Response of coconut varieties in relation to different seasons for the eriophyid mite damage

The coconut eriophyid mite damage was higher in summer where as it was lower in winter. Higher damage was recorded in dwarf green variety and less damage in west coast tall (WCT), In hybrid variety, higher damage found in D x T as compared to T x D.



(Agril Research Station, JAU, Mahuva)

## Efficacy of newer insecticides against diamond back moth infesting cauliflower

In South Saurashtra Agro-climatic Zone growing cauliflower in *rabi* season are advised to apply two spray of chlorantraniliprole 18.5 SC 0.006 % (3.2 ml/10 litre of water) at 15 days interval starting from pest infestation for effective and economical management of diamond back moth.



Farmers' recommendation approved as scientific information as it is not fulfilling the CIB guide line.

(Department of Entomology, CoA, JAU, Junagadh)

## Plant Pathology

Year: 2005-06

### Chickpea

The crop rotation of chickpea after sorghum OR chickpea after *bajra* and apply castor cake in furrow @ 500 kg/ha at the time of sowing with seed treatment of carbendazim 1 g + thiram 2 g/kg seed OR castor cake in furrow @ 500 kg/ha at the time of sowing with seed treatment of tebuconazole 3 g/kg seed gave the effective management of wilt in irrigated *rabi* chickpea under South Saurashtra Agro-climatic Zone.

(Pulse Research Station, JAU, Junagadh)

Year: 2006-07

### Cotton

Seed treatment @ 10g/kg seed + soil application @ 2.5 kg/ha at the time of sowing with *Pseudomonas fluorescens* strain Pf 1 or *Pseudomonas fluorescens* strain Pf 2- CHAO strain was found effective for management of bacterial blight of cotton and seed treatment @ 10 g/kg seed + foliar spray @ 0.2% of the above strain at 30, 60 and 90 days after sowing significantly reduced the bacterial leaf blight of cotton variety G.Cot.Hy-10.

(Cotton Research Station, JAU, Junagadh)

### Ber

The intensity of powdery mildew (*Oidium erysiphoides*) of ber increased with the decrease in maximum temperature below 35° C, minimum temperature below 20° C and morning relative humidity.

(Main Dry Farming Research Station, JAU, Targhadia)

**Year: 2007-08**

**Groundnut**

*Pseudomonas fluorescens* Pf-1 (ICBR 1:23.34) and *Trichoderma viride* - Local (ICBR 1:26.28) as seed treatment @ 10 g/kg seed are highly effective and economical in reducing collar rot, stem rot and tikka diseases of groundnut.

(Main Oilseed Research Station, JAU, Junagadh)

**Year: 2014-15**

**Effect of fungicides application in cumin on *Trichoderma* applied in soil**

Soil drenching of carbendazim 50 WP @ 2 kg in 2000 litre water/ha or foliar spray of mancozeb 75 WP @ 30 g/10 litre or hexaconazole 5 EC @ 10 ml/ 10 litre against soil borne diseases do not reduce the population of *Trichoderma harzianum* applied in soil.

(Department of Plant Pathology, CoA, JAU, Junagadh)

**Effect of foliar application of insecticides in cumin on *Trichoderma* applied in soil**

Foliar spray of imidacloprid 17.8 SL @ 3 ml/10 litre or dimethoate 30 EC @ 10 ml/10 litre in cumin against sucking pests do not reduces the population of *Trichoderma harzianum* applied in soil.

(Department of Plant Pathology, CoA, JAU, Junagadh)

**Effect of foliar application of herbicides in cumin on *Trichoderma* applied in soil**

Herbicides used as pre-emergence or early post emergence in cumin viz., pendimethalin 30 EC, 0.9 kg a.i./ha, 60 ml/10 litre at 2 DAS or glyphosate 41 SL, 0.75 kg a.i./ha, 37 ml/10 litre at 2 DAS reduces the soil population of *Trichoderma* up to one month after sowing but *Trichoderma* population was increased at later stage. While application of oxyfluorfen 23.5 EC, 0.240 kg a.i./ha, 20 ml/10 litre at 2 DAS do not reduce the population of *Trichoderma harzianum* applied in soil.

(Department of Plant Pathology, CoA, JAU, Junagadh)

**Disease management through organic practices for organic groundnut cultivation**

Blanket furrow application of FYM @ 7.5 tonne/ha followed by *Trichoderma viride* as seed treatment @ 10 g/kg seed and *T. viride* @ 4.0 kg enriched in 250 kg FYM and as spray @ 2.5 kg/ha (5 g/litre of water) at 30 and 45 DAS found effective for the management of diseases of groundnut.

(Main Oilseed Research Station, JAU, Junagadh)

**Year: 2015-16**

**Management of alternaria leaf blight of groundnut**

Three sprays of difenconazole 25EC 0.025% (10 ml/10 lit of water) at 35, 50 and 65 days after sowing was found effective and economical for management of alternaria leaf blight of groundnut grown in summer season.

(Main Oilseeds Research Station, JAU, Junagadh)

**Integrated management for wilt disease of chickpea**

Seed treatment of *Trichoderma harzianum* 1% WP @ 4 g/ kg of seed or carboxin 37.5 + thiram 37.5 DS (Ready mix Vitavex powder) @ 2 g/kg seed along with soil application of *T. harzianum* 1% WP @ 4.0 kg/ha at the time of sowing in furrow was found effective against chickpea wilt under irrigated condition.



(Pulse Research Station, JAU, Junagadh)

**Management of foliar and fruit spot diseases in bottle gourd**

Four sprays of difenconazole 25 EC 0.025 % (10 ml/10 lit of water) or hexaconazole 5 EC 0.005 % (10 ml/10 lit of water) at 10 days interval after appearance of the disease was found effective

and economical for management of foliar and fruit spot diseases of bottle gourd grown in *khari* season.

(Vegetable Research Station, JAU, Junagadh)

**Year: 2016-17**

### **Wilt disease development in popular cultivars as influenced by different dates of sowing under changing climate in chickpea**

The popular chickpea cultivars *viz.*, JG 16, GG 1, GJG 3 and GG 5 exhibited low wilt incidence and high seed yield as compared to JG 62 (susceptible cultivar). The lowest wilt incidence was recorded in JG 16. In case of date of sowing, no significant differences in wilt incidence and seed yield were found. The low wilt incidence was recorded in normal date of sowing (5<sup>th</sup> November). Therefore; it was determined that popular cultivars possessed resistance against wilt disease till today.

(Pulse Research Station, JAU, Junagadh)

**Year: 2017-18**

### **Management of fungal foliar diseases of cotton**

Three spray of mancozeb 63 WP + carbendazim 12 WP, 0.15 % (20g / 10 litre of water) first at initiation of disease and subsequent sprays at 15 days interval was found effective and economical for management of fungal foliar diseases of cotton.



(Cotton Research Station, JAU, Junagadh)

### **IDM Package for tomato diseases**

For effective and economical integrated management of major diseases of tomato *viz.*, damping off, early blight, tomato leaf curl virus and tomato spotted wilt virus disease and to improve the marketable fruit yield following treatments should be adopted.

1. Seeds of tomato should be treated with seed pro @ 4 g per kg seeds at the time of sowing in nursery and after germination of the seeds soil drenching with seed pro @ 5 % should be carried out.
2. Tomato nursery should covered with 40 - 60 mesh white nylon net until transplanting and at the time of transplanting tomato seedling should be dip with 0.1 % (carbendazim 12 % + mancozeb 63 WP) solution.
3. Maize should be grown as border crop surrounding transplanted tomato field. The foliar sprayings of pesticides should be scheduled as acephate 75 WP @ 1.5 g / litre 10 days after transplanting, fipronil 5 SC @ 1.5 ml / litre 20 DAT, copper hydroxide 77 WP @ 2.0 g / litre 25 DAT and imidacloprid 70 WG @ 2g / 15 litre 40 DAT along with two to three spraying of Fenamidone 10 % + Mancozeb 50 WDG, 0.25 % from 45 DAT at 10 days intervals.

(Vegetable Research Station, JAU, Junagadh)

### **Studies of weather parameters in relation to initiation and development of stem rot of groundnut**

The infection of stem rot in groundnut was commenced in 28<sup>th</sup> std. week, which developed gradually and reached a peak in 33<sup>rd</sup> std. week. All the weather parameters *viz.*, minimum temperature, maximum temperature, morning relative humidity, afternoon relative humidity, soil temperature @ 10 cm, rain fall and rainy days were found significantly co-related in building up the disease incidence in groundnut. The influence of all the weather parameters was found 39.10 per cent.

(Main Dry Farming Research Station, JAU, Targhadia)



## Developing IDM modules for the management of cotton diseases

Apply the following Integrated Disease Management Module (IDM) for management of cotton diseases and higher net return.

### IDM Module-1:

1. Seed treatment with *Pseudomonas fluorescens* ( $2 \times 10^8$  cfu/g-JAU isolate) @ 10 g/kg seed.
2. Soil application of *Trichoderma harzianum* ( $2 \times 10^6$  cfu/g-JAU isolate) @ 2.5 kg/ha in 250 kg of FYM.
3. Foliar sprays with *Pseudomonas fluorescens* ( $2 \times 10^8$  cfu/g-JAU isolate) 1 % for alternaria leaf spot and copper oxychloride (0.2 %) + streptocycline (0.01%) for bacterial leaf blight on need basis.



OR

### IDM Module- 2:

1. Seed treatment with *Pseudomonas fluorescens* ( $2 \times 10^8$  cfu/g- CICR isolate) @ 10 g/kg seed.
2. Soil application of *Trichoderma viride* ( $2 \times 10^6$  cfu/g-TNAU isolate) @ 2.5 kg / ha in 250 kg of FYM;
3. Foliar sprays with kresoxim-methyl 44.3 SC @ 1ml/lit followed by captan 70 % + hexaconazole 5 % @1.5 g/lit for fungal diseases and copper oxychloride (0.3 %) + streptocycline (0.01 %) for bacterial blight.

Farmers' recommendation approved as scientific information as it is not fulfilling the CIB guide line.



(Cotton Research Station, JAU, Junagadh)