

## Technology developed and recommended

### ➤ Crop Production (Agronomy)

- 1. Effect of foliar application of organic and inorganic nutrients sources on growth, yield and quality of greengram (*Vigna radiata* (L.) Wilczek) (2021-22) :** The farmers of Middle Gujarat Agro-climatic Zone growing greengram in summer season are recommended to apply, 50 % RDF (10 kg N and 20 kg P<sub>2</sub>O<sub>5</sub>/ha) as basal *fb* foliar spray of 3 % cow urine at pre- flowering stage,  
OR

50% RDF (10 kg N and 20 kg P<sub>2</sub>O<sub>5</sub>/ha) as basal *fb* foliar sprays of 10 % vermiwash at pre-flowering and pod formation stage for getting higher yield and net return and for saving 50 % of nitrogen and phosphorus.

- 2. Effect of foliar application of organic and inorganic nutrients sources on growth, yield and quality of blackgram (*Vigna mungo* (L.) Hepper) (2021-22) :** The farmers of Middle Gujarat Agro-climatic Zone growing blackgram in summer season are recommended to apply 50% RDF(10 kg N and 20 kg P<sub>2</sub>O<sub>5</sub>/ha) as basal *fb* foliar sprays of 10 % vermiwash at pre-flowering and pod formation stage for getting higher yield, net return and saving of 50 % of nitrogen and phosphorus.
- 3. Response of chickpea varieties to irrigation at critical growth stages (2021-22) :** The farmers of Middle Gujarat Agro-climatic Zone growing chickpea are recommended to apply three irrigations, first at the time of sowing and remaining two irrigations at branching or at flowering stage and pod development stage for obtaining higher yield and net return.
- 4. Effect of foliar application of organic and inorganic nutrients sources on growth, yield and quality of blackgram (*Vigna mungo* (L.) Hepper) (2020-21) :** The farmers of middle Gujarat Agro-climatic Zone growing blackgram during *khariif* season are recommended to apply 10 kg N and 20 kg P<sub>2</sub>O<sub>5</sub>/ha as basal along with foliar spray of 10 % vermiwash at pre-flowering and pod formation stage for obtaining higher yield and net return.
- 5. Effect of foliar application of organic and inorganic nutrients sources on growth, yield and quality of greengram (*Vigna radiata* (L.) Wilczek) (2020-21) :** The farmers of middle Gujarat Agro-climatic Zone growing greengram during *khariif* season are recommended to apply 10 kg N and 20 kg P<sub>2</sub>O<sub>5</sub>/ha as basal along with foliar spray of either 3% urine of indigenous cow at pre-flowering stage OR 10 % vermiwash at pre-flowering and pod formation stages for obtaining higher yield and net return.
- 6. Integrated weed management in blackgram (*Vigna mungo* L.) (2019-20) :** The farmers of Middle Gujarat Agro-climatic Zone growing *khariif* blackgram are recommended to adopt Post-emergence (20 - 25 DAS) application of propaquizafop 10% EC 75 g a.i./ha (15 ml/10 liter of water) *fb* IC + HW at 30 DAS or Post-emergence (20 - 25 DAS) application of fenoxaprop-p-ethyl 9% EC 67.5 g a.i./ha (15 ml/10 liter of water) *fb* IC + HW at 30 DAS or

Post-emergence (20 - 25 DAS) application of quizalofop-ethyl 5% EC 50 g a.i./ha (20 ml/10 liter of water) fb IC + HW at 30 DAS for effective weed management of complex weed flora and higher net return without any herbicide residues in produce and soil. There was no any adverse effect of herbicide applied in blackgram on succeeding crops.

7. **Integrated weed management in blackgram [*Vigna mungo* (L.)] (2019-20):** It is for the information of scientific community that pendimethalin 30% EC 1000 g a.i./ha PE fb quizalofop-ethyl 5% EC 50 g a.i./ha PoE provide effective weed management of weed flora and higher net return in blackgram and without any herbicide residues in produce and soil. There was no any adverse effect of herbicide applied in blackgram on succeeding maize, chickpea and wheat crops.
8. **Effects of sowing time and spacing on growth and yield of chickpea for green pod (2019-20) :** The farmers of middle Gujarat agro-climatic zone growing chickpea (cv. GG 2) for green pod are recommended to sow the crop during first week of October keeping 45 x 10 cm spacing for securing higher green pod yield and net return.

### Entomological Research Recommendations

1. **Surveillance programme of *Helicoverpa armigera* in pigeonpea (2021-22) :** The larval population of *Helicoverpa armigera* in pigeonpea had a positive significant correlation with the minimum temperature. Seed damage due to pod fly, *Melanagromyza obtusa* had a highly significant negative correlation with minimum temperature and sunshine hours, but it has highly significant positive correlation with morning and evening relative humidity. The peak activity of *H. armigera* was observed during 47th to 51st SMW, while in case of pod fly, it was 52nd to 2nd week.
2. **Screening of pigeonpea genotypes against insect pests and disease under natural conditions (2020-21):** Out of 24 pigeonpea genotypes/cultivars screened, the genotype VPG-39 found moderately resistant against *Helicoverpa armigera* while, VPG-297 found moderately resistant against pod fly, *Melanagromyza obtusa*. The varieties AGT-2 and Vaishali still remained moderately resistant by remaining at par with the VPG-39 and VPG-297 against insect pests (*H. armigera* and *M. obtusa*).
3. **Efficacy of different botanicals against pod borer complex of pigeonpea (2020-21):** Farmers of Gujarat are recommended to spray azadirachtin 0.15 EC, 0.0006% (40 ml/10 litre water) or neem seed kernel extract 5% (500 g/10 litre water) at initiation of pest and subsequent two sprays at 10 days interval for effective management of pod borer complex (*Helicoverpa armigera*, plume moth and pod fly) in pigeonpea.
4. **Determination of economic threshold level for gram pod borer in chickpea (2019-20):** The farmers of middle Gujarat Agro-climatic zone growing chickpea are advised to initiate control measures when population of gram pod borer, *Helicoverpa armigera* crosses the economic threshold level as 13 larvae per 20 plants.
5. **Screening of urdbean genotypes against insect pests and diseases under natural conditions(2018-19):** Out of 20 blackgram genotypes screened, VUG-07 was found resistant against insect pests viz., whitefly, aphid, jassid, thrips and spotted pod borer, *Maruca vitrata* and gave higher grain yield under field condition. The scientists

working in breeding programme are advised to utilise genotype VUG-07 for resistance breeding programme.

**6. Screening of mungbean genotypes against insect pests and diseases under natural conditions (2018-19):** Out of 17 greengram genotypes screened, VMG-67 was found resistant against insect pests *viz.*, whitefly, aphid, jassid, thrips, spotted pod borer (*Maruca vitrata*) and yellow mosaic disease and gave higher grain yield under field conditions. The scientists working in breeding programme are advised to utilise genotype VMG-67 for resistance breeding programme.

**7. Impact of sowing periods on incidence of pest complex in pigeonpea (2017-18):** For the management of pod fly, farmers of middle Gujarat growing pigeonpea are recommended to adopt Vaishali variety and sow the crop during third week of June to first week of July.

### **Plant pathological Research Recommendations**

**1. Bio-efficacy of newer fungicides against powdery mildew of clusterbean (2017):** Farmers of middle Gujarat growing clusterbean in *kharif* season are recommended to spray Hexaconazole 5 SC, 0.005% (10 ml/10lit water) twice to manage powdery mildew. The first spray is to be applied at the time of initiation of the disease and second at 15 days of first spray.

**2. Screening of blackgram genotypes against yellow mosaic disease (2017):** VUG-14-1 genotype of blackgram found resistant against Yellow mosaic disease under high disease pressure in field conditions.