Technology Developed

A. Crop Improvement:

→ Thirteen improved varieties and one hybrid in Grain sorghum and five improved single cut fodder sorghum varieties have been released.

→ Details of released Variety/ Hybrid

Sr. No.	Name of Variety	Year of Release	Special Features
Grain Sorghum			
1	GJ-9	1979	Late, rabi, curved ear head
2	GSH-1	1982	Kharif, pearl white grain
3	GJ-35	1982	Early (110 days) compact ear head
4	GJ-36	1986	Early kharif & Rabi (110 days) bold grain, tolerant to grain mold
5	GJ-37	1986	Early (100 days) Suitable for grain & fodder both, thin stem
6	GJ-38	1992	Suitable for late kharif in heavy rainfall area
7	GJ-39	1993	Early (100 days) Suitable for grain & fodder both, thin steam
8	GJ-40	1995	Life span 104-108 days, round, pearl white grain
9	GJ-41	1999	Early (90 days) round & pearl white grain , suitable in moist stretch condition
10	GJ-42	2009	Mid-late 110 days, round & pearl white grain , suitable for heavy rainfall area
11	GNJ-1	2016	Higher in grain yield over check GJ 38, GJ 42 and CSV-20(NC) and Grain mold resistant with less incidence of Ergot disease and stem borer as compared to better check GJ-42.
12	Phule Revati	2018 Endorsed	High grain and dry fodder yield as compared to local and national *rabi* check in irrigation as well as residual moisture condition, less incidence of pest and disease
13	GJ-44 (Madhu)	2020	High grain yield as compared to local and national *kharif* check, less incidence of pest and disease, good quality of grain.
14*	*Rabi* Sorghum variety ***GJ-101 (Madhu *Moti*)	2021	Release proposal was accepted by 17th Combined Joint AGRESCO Meeting of SAU's . Higher grain and dry fodder yield as compared to local and national *rabi* check in irrigation as well as residual moisture condition, less incidence of pest and disease, good quality of grain.
Fodder Sorghum			
1	GFS-4	1989	Early (45 days) thin steam, Leaves-12 to 15, suitable in moist stress condition
2	GFS-5	1999	50 % flowering at 55-60 days, Thick stem, tan types, stay green
3	CSV 21 F (AICSIP)	2006	50 % flowering at 70-75 days, Lowest HCN content (68 ppm), Released at national level also.

4	GFS-6	2018	50 % flowering at 77-81 days, Stem thickness medium, broad leaves. Good in fodder quality parameters, less infestation of leaf blight and anthracnose
5**	****** CSV-46F (*Tapi Chari*)	2020	Higher green as wll as dry fodder yield as compared to local and national fodder check, suitable for single cut, moderately resistance to anthracnose and leaf blight diseases, less incidence of shoot fly and stem borer and good fodder quality.

*Release proposal submitted to SSSC, Gujarat

** Release proposal approved by VIC, AICRP

B. Crop Production:

For improved Agronomical practices total forty technologies has been developed and recommended for the sorghum growing farmers in the area of fertilizers, time and spacing of sowing, weed control, inter cropping, crop sequencing etc. as below

→ **Sowing time x fertility level interaction in sorghum variety GJ 35 : (1986)**

In South Gujarat, sorghum variety GJ 35 for grain purpose should be sown during the first fortnight of August with the basal dose of 80 kg N and 40 kg P_2O_5 per ha.

→ **Transplanting of sorghum : (1989)**

In the heavy rainfall areas of South Gujarat, when the field conditions do not permit direct sowing, the farmers can transplant the crop. The transplanting should be in the first week of August with 24 days old seedlings.

→ **Fertilizer Management for grain sorghum : (1989)**

- Farmers of South Gujarat growing sorghum GJ-36 and GJ-39 are advised to fertilize the crop at the rate of 80 kg N/ha and 40 kg P_2O_5 /ha.
- Of the total fertilizer, 50 per cent N + whole quantity of P_2O_5 should be applied at the time of sowing and remaining 50 per cent of N should be given as top dress, one month after sowing.
- The farmers who cannot afford to apply this quantity of fertilizers are advised to apply 40 kg N/ha and 40 kg P_2O_5 /ha. The method application of fertilizers will remain the same.

→ **Date of sowing for Sorghum + Tur intercropping : (1989)**

Farmers of South Gujarat growing sorghum – CSH 6 with pigeon pea in the ratio of 2 (Sorghum): 1 (pigeon pea) rows are advised to carryout sowing with the onset of monsoon. They are also advised to take recommended plant protection measures for the control of stem borer.

→ **Fertilizer management in Forage Sorghum : (1989)**

Farmers of North Saurashtra zone are advised to fertilize their forage sorghum crop (Gundri or SSG-59-3) with 60 kg N (additional net return of Rs. 1660 /ha) and 20 kg P2O5 /ha (additional net return of Rs.300/ha). The marginal farmers may apply 20 kg N (additional net return of Rs. 810 /ha) and 10 kg P2O5 (additional net return of Rs. 145/ha).

→ **Time of sowing for SORGHUM var. GJ 36 (1991)**

The farmers of South Gujarat Agro-climatic zone-II are advised to sow var. GJ 36 of Sorghum up to 20th August. Later sowing resulted in reduction in yield.

→ **Seed rate and spacing for sorghum GJ 37 (1992)**

The farmers of North Gujarat growing sorghum variety GJ 37 for dual purpose are advised to sow at a distance of 30 cm between rows using 20 kg seed rate per hectare.

→ **Fertilizer Management in Sorghum GJ – 37 : (1992)**

The farmers of North Gujarat zone are advised to apply 80 kg N/ha (ICBR 1:10.9) and 40 kg P_2O_5 /ha (ICBR 1:2.84) to sorghum variety GJ-37 to get economic return of grain and stover yield.

→ **N and P requirement of Sorghum GJ – 35 and GSH – 1 : (1992)**

The farmers of North Gujarat region growing sorghum varieties GSH-1 and GJ- 35 are advised to fertilize the crop with nitrogen and phosphorus @ 120 kg and 40 kg/ha, respectively. Of the total fertilizer, 50% nitrogen and whole quantity of P_2O_5 should be applied as basal dressing and remaining 50% of nitrogen should be given as top dressing 30 days after sowing.

For marginal farmers, it should be apply 80 kg N and 40 kg P_2O_5 per hectare with similar method of application as above.

→ **Seed Rate and Fertilizer Requirement of Fodder Sorghum : (1992)**

The farmers of North Gujarat growing variety GFS-4, are advised to sow the crop with the seed rate of 80 kg/ha and fertilize it with the application of 40 kg N/ha and 60 kg P_2O_5 /ha to get economic return of green fodder yield. Of the total fertilizer, 50% nitrogen and whole quantity of P_2O_5 should be applied as basal dressing and remaining 50% of nitrogen should be given as top dressing 30 days after sowing.

→ **Seed Rate and Fertilizer Dose for Fodder Sorghum GFS – 4 : (1992)**

The farmers of South Gujarat agro climatic zone (I & II) growing sorghum variety GFS – 4 are advised to sow the crop with seed rate of 80 kg/ha and apply nitrogen and phosphorus @ 80 kg and 40 kg/ha, respectively. Of the total fertilizer, 50% nitrogen and whole quantity of P_2O_5 should be applied as basal dose and remaining 50% of nitrogen should be given as topdressing 30 days after sowing.

Marginal farmers should adopt 60 kg seed rate and 40 kg N and 40 kg P_2O_5 /ha with similar method of application as above.

→ **Fertilizer Requirement of Fodder Sorghum GFS – 4 : (1992)**

The farmers of South Gujarat (Agroclimatic zone-I and II) growing sorghum fodder variety GFS- 4 are advised to fertilizer the crop with 80 kg N/ha for getting higher economic return. Of the total 80 kg nitrogen, 40 kg N/ha should be applied as basal dose, 20 kg N/ha after 1st cut immediately and remaining 20 kg N/ha at 15 days after 1st cut.

→ **Seed rate and N requirement for fodder sorghum (1993):**

The farmers of Dhari area of South Saurashtra zone growing sorghum variety GFS 4 are advised to plant the crop with the seed rate of 80 kg/ha and apply nitrogen @ 40 kg/ha to get economic return of green fodder yield. Of the total fertilizer, 50% nitrogen should be applied as basal dressing and remaining 50% of nitrogen should be given as top dressing 25 days after sowing.

→ **Fertilizer management in Sorghum – Isabgul : (1993)**

The farmers of North Gujarat Zone are advised to grow the crop of sorghum with 100% recommended dose (*i.e.* 80-40-00 NPK kg/ha) in *kharif* and the succeeding Isabgul crop should be fertilized with the 50% recommended dose (*i.e.* 25-50-00 NPK kg/ha) to get maximum economic return.

→ **Weed management in Sorghum : (1993)**

The farmers of South Gujarat Agro climatic (Zone I,II) are advised to follow weed management involving application of Atrazine as pre emergence @ 1.5 kg/ha in 600 lit. of water for getting higher economic return (C BR – 1 : 12)

→ **Weed management in sorghum for North Gujarat : (1993)**

The farmers of North Gujarat (zone IV) advised to control the weed by application of Atrazine (Pre-emergence) @ 1.5 kg/ha with one hand weeding and one interculturing for highest economical return in sorghum.

→ **Bio fertilizer in sorghum : (1993)**

For obtaining higher sorghum grain and fodder yield, seed inoculation either with Azospirillum ASA 1 (ICBR 1:10.0) or Azotobactor ABA 1 (ICBR 1:9.46) each having 108 viable cell/g (200 g culture/10 kg seeds) alongwith the recommended dose of 40 kg N/ha is recommended for marginal farmers of South Gujarat.

→ **Spacing requirement of sorghum : (1994)**

The farmers of North Gujarat Agroclimatic Zone (AES-IV) growing sorghum crop for dual purpose are advised to adopt GSH-1 with a spacing of 30 x 18 cm.

→ **Spacing requirement of sorghum : (1994)**

The farmers of South Gujarat Agro climatic Zone II growing sorghum GSH-1, GJ-35-15-15 and GJ – 38 are advised to drill the crop at a distance of 45 x 12 or 60 x 9 cm for getting maximum yield. (The distance between plant to plant in a row is to be adjusted at the time of thinning)

→ **Time of sowing for sorghum : (1994)**

The farmers of South Gujarat (zone-II) are advised to sow GJ-36 between 20th July and 5th August and GJ – 39 in the first week of July for getting maximum yield.

→ **Nitrogen and phosphorus for sorghum : (1994)**

The farmers of South Gujarat (zone-II) are advised to grow sorghum GJ – 38 by fertilizing the crop by 160 kg N/ha (ICBR 1:13.4) and 60 kg P_2O_5 /ha (NICBR 1:5.3). Half of the nitrogen dose and all of the P dose are to be applied as basal and remaining half of nitrogen is to be top dressed 30 days after sowing.

→ **Nitrogen and phosphorus for sorghum : (1994)**

The farmers of North Gujarat (AES IV) growing sorghum (GJ 39) are advised to fertilize the crop with 120 kg N/ha (NICBR 1:19) and 40 kg P_2O_5 /ha (NICBR 1:4.5). Half of the nitrogen dose and all of the P dose are to be given as basal and 50% of the nitrogen to be topdressed 30 days after sowing.

→ **Fertilizer management in *Rabi* sorghum (1996)**

The farmers of South Gujarat Agroclimatic Zone (AES-V) are advised to grow *rabi* sorghum GJ 36 by fertilizing the crop with 80 kg N/ha. Though, application of P_2O_5 @ 20 kg/ha increased the yield, it was not economical.

→ **Crop geometry in sorghum : (1996)**

The farmers of South Gujarat Agroclimatic Zone (AES-V) are advised to grow *rabi* sorghum GJ 36 keeping 60 cm distance between rows and 10-12 cm distance between two plants.

→ **Seeding technique in *rabi* sorghum / sowing depth in *rabi* sorghum : (1996)**

The farmers of South Gujarat agro climatic Zone (AES V) growing *rabi* sorghum should sow the seed in the moist zone.

→ **Time of sowing for sorghum (1997):**

In North Gujarat agro climatic conditions, sorghum variety GJ – 39 should be sown at the onset of monsoon.

→ **Seed rate and spacing for sorghum GJ 37 : (1997)**

The farmers of North Saurashtra are advised to sow sorghum variety GJ – 37 with a seed rate of 40 kg/ha and inter row spacing of 30 cm.

→ **Seed rate and fertilizer requirement of sorghum : (1997)**

The farmers of North Gujarat Zone growing sorghum variety GJ – 39 for fodder purpose should use a seed rate of 50 kg/ha (CBR – 1:4.4) and fertilizer with N and P @ 80:40 kg/ha (CBR-1:3.30)

→ **Fertilizer management in sorghum : (1997)**

The sorghum (CSH – 5) growing farmers of AES-VI of North Saurashtra are advised to fertilize their crop with 60 kg N/ha (50% basal + 25% 30 DAS + 25% 45 DAS) to realize an ICBR of 1:10. Application of P was not found beneficial.

→ **Fertilizer requirement of sorghum variety GJ 40 : (1997)**

The farmers of South Gujarat zone are advised to fertilize their sorghum crop (GJ 40) with 120 kg N and 40 kg P_2O_5 /ha to get about 25% more income than from the existing recommendation.

→ **Zn and Fe requirement of sorghum (1998)**

Farmers of the AES-I of North Gujarat Ago-climatic Zone growing sorghum CV. GJ – 39 on Fe and Zn deficient light textured soils are advised to apply 3 sprays of $FeSO_4$ @ 0.5 per cent after 30 DAS at 10 days interval for getting higher grain yield (75 per cent). Spraying of $ZnSO_4$ @ 0.5 per cent also increased the yield by 44 per cent.

→ **Bio fertilizer of Sorghum Grain : (1998)**

Farmers of South Gujarat Zone AES II are advised to coat sorghum seeds with PSM strain PBA 16 (Bacillus coagulans) having 108 CFU/ gram carrier @ 30 g culture/kg seeds (ICBR 1:382) before seeding to save 40 kg P_2O_5 /ha and to get higher grain and stover yield.

→ **Fertilizer management in sorghum based cropping system : (1999)**

The farmers of South Gujarat zone (AES-II) adopting *kharif* sorghum (GJ 38) – cotton (Hy. 6) rotation are advised to apply 50% of recommended dose of fertilizer for sorghum (80:40) and 100% of recommended dose of fertilizer (320:00) to cotton.

→ **Response of sorghum (GJ 41) to various levels of fertilizer (2000)**

The farmers of North Gujarat (Agroclimatic Zone-IV) growing fodder sorghum var.GJ-41 are advised to fertilize the crop with nitrogen and phosphorus @ 80 kg and 40 kg/ha, respectively. Of the total fertilizer, 50 per cent of nitrogen and entire quantity of phosphorus should be applied as basal and remaining 50 per cent nitrogen as top dressing at 30 days after sowing.

→ **Varietal response to fertilizer on fodder sorghum : (2000)**

The farmers of North Gujarat (Agro climatic Zone-IV) growing fodder sorghum variety GFS-5 are advised to fertilize the crop with nitrogen and phosphorus @ 80 kg and 20 kg/ha, respectively. Of the total fertilizer, 50 per cent of nitrogen and entire quantity of phosphorus should be applied as basal and remaining 50 per cent of nitrogen as top dressing at 30 days after sowing.

→ **Nitrogen and phosphorus requirement of sorghum varieties GJ 39 and GFS 4 (2002)**

Farmers of North Saurashtra Agro climatic Zone-VI who are growing sorghum as a green fodder crop are advised to grow *Kharif* sorghum var. GJ 39 and fertilize it with 40 kg N/ha for getting maximum green fodder yield and return. Phosphorus application is not found beneficial.

→ **Response of forage sorghum to different seed rate and nitrogen levels for higher production : (2004)**

The farmers of North Saurashtra agro climatic zone VI growing forage sorghum as a green fodder crop during *Kharif* season are advised to keep the seed rate of 50 kg/ha and the crop should be fertilized with 120 kg N/ha (60 kg as a basal dose and 60 kg as a top dressing at 30 days after sowing). Phosphorus @ 40 kg/ha should be applied as common dose.

→ **Response of single cut fodder sorghum genotypes to different levels of NPK (2012)**

The farmers of south Gujarat agroclimatic zone-II growing kharif fodder sorghum are advised to grow genotype CSV-21F with the application of 120:60:00 kg NPK/ha (50%N and whole P as basal, while remaining 50% N as top dressing at 30 DAS) for higher fodder yield and net profit.

→ **Integrated weed management in kharif sorghum (2013)**

The farmers of south Gujarat agroclimatic zone-II growing kharif sorghum GJ-38 are advised to apply 0.75 kg/ha atrazine as pre emergence herbicide + one hand weeding at 50 DAS for getting higher yield and net profit.

→ **Refinement of sowing dates for *kharif* grain sorghum varieties/ promising lines under changing climate of South Gujarat (2016)**

The farmers of South Gujarat Agro-climatic Zone II (AES-II) growing *kharif* sorghum are advised to sow sorghum during onset of monsoon or within 15 days after onset of monsoon for getting higher grain yield, stover yield as well as net profit and to escape from shoot fly and stem borer attack. Late sowing of sorghum significantly reduces the grain yield, stover yield and net return.

→ **Weed management in *kharif* grain sorghum (2020)**

The farmers of South Gujarat Agro-climatic Zone growing kharif sorghum are recommended to carry out two hand weeding at 25 and 50 DAS and one inter culturing at 50 DAS for effective weed control and achieving higher yield and net return.

→ **Weed management in *kharif* grain sorghum (2020) [Only scientific community]**

Application of atrazine 1.5 kg/ha as a pre-emergence fb one hand weeding at 40 DAS was found effective for weed control in kharif sorghum. Residue analysis of the herbicide was carried out and found below detectable level.

C. Crop Protection (Entomology):

→ **Control of sorghum stem borer by seedling root-dip in insecticides (24th PPSC, 1988-89)**

The farmers of South Gujarat are advised to transplant the 24 days old healthy sorghum seedlings after 6 hours root dip in any one of the following insecticides.

Sr. No.	Name of insecticide	Concentration
1.	Carbofuran 35 ST	0.035%
2.	Phosphamidon 100 EC	0.03%
3.	Methyl-o-demeton 25 EC	0.05%
4.	Chlorpyriphos 20 EC	0.05%

→ **Chemical control of sorghum stem borer (28th PPSC, 1992-93)**

From the results of three years it can be concluded that leaf whorl application of Cartap (Paden) 4G @ 7.5 kg/ha or insecticidal spray of monocrotophos 36 WSC @ 0.04% effectively reduced the stem borer dead hearts and stem tunneling percentage

→ **Chemical control of sorghum shoot fly (28th PPSC, 1992-93)**

From the results of three years data as well as pooled analysis carbofuran 25 ST @ 4 or 5% (16 or 20 g/100 of seed) as a seed treatment is recommended for the control of sorghum shoot fly in South Gujarat.

→ **Integrated pest management of sorghum pests (28th PPSC, 1992-93)**

Combined treatment of Carborufan 3G @ 2g/m row + high seed rate @ 10 kg/ha + release of egg parasite, *Trichogramma chilonis* @ 5 lacks adults/ha on 7, 14 and 21 DAG or combined treatment of Carbofuran 3G @ 2g/m row + high seed rate @ 10 kg/ha is recommended for the control of sorghum stem borer and shoot fly.

→ **Chemical control of sorghum stem borer (32nd PPSC, 1996-97)**

The sorghum growing farmers are advised to spray Cypermethrin 0.005% and endosulfan 0.07% at 20 DAE and 30 DAE, respectively (ICBR 1:31.90) for the control of stem borer.

→ **Chemical control of sorghum midge (32nd PPSC, 1996-97)**

The sorghum growing farmers are advised to apply two sprays of profenophos @ 0.1 per cent first at penical emergence and second at 10 days after first spray (ICBR 1:10.44) for the control of sorghum midge.

→ **Chemical control of sorghum earhead bug (32nd PPSC, 1996-97)**

The sorghum growing farmers are advised to apply two sprays of Profenophos @ 0.1 per cent first before milking stage and second at soft dough stage (ICBR 1:12.35) for the control of earhead bugs.

→ **Chemical control of earhead worm with biopesticides (32nd PPSC, 1996-97)**

The sorghum growing farmers are advised to apply two sprays of HNPV @ 250 LE/ha first at flowering stage and second at dough stage (ICBR 1:25.82) for the control of earhead worms.

→ **Chemical control of sorghum mite (34th PPSC, 1998-99)**

Application of any one of the following pesticides at profuse build up of spider mite, *Oligonychus indicus* in sorghum is recommended for its effective and economical control under South Gujarat conditions

1. Dicofol @ 0.04% (ICBR 1:16.05)
2. Endosulfan @ 0.07% (ICBR 1:14.16)
3. Wettable sulpher @ 0.25% (ICBR 1:17.45)

→ **Chemical control of stem borer (35th PPSC, 1999-2000)**

It is recommended that the sorghum growing farmers of South Gujarat are advised to apply any one of the following insecticides for the control of stem borer

1. Mix spraying of Azadex 100@ 5% + Endosulfan 35EC @ 0.075% at 20 DAE
2. Mix spraying Azadex 100 @ 5% + Imidacloprid 200 SL @ 0.005% at 20 DAE
3. Imidacloprid 200 SL @ 0.005% at 20 DAE

→ **Development of IPM modules for the control of sorghum pests (35th PPSC, 1999-2000)**

The sorghum growing farmers of South Gujarat are advised to follow any one of the following IPM modules for the effective and ecofriendly control of sorghum pests.

Module-I

1. Use of high seed rate i.e. 10 kg/ha
2. Shoot fly: Thinning at 11 DAE, removal of shoot fly infested plants as well as thinning of unhealthy plants. Spraying of Neem formulation NSKE 3% or any other neem formulation at 12 DAE.
3. Stem borer : Release of *Trichogramma chilonis* @ 2 lakh/ha at 21 DAE (Immediately after 2nd thinning at 20 DAE as maintaining 2 lakh plants/ha on threshold basis)
4. Stem borer : Spraying of neem formulation NSKE @ 3% or any commercial product of neem on threshold basis at 30 DAE
5. Stem borer : Release of *Trichogramma chilonis* @ 2 lakh/ha on threshold basis at 44-48 DAE.
6. Mite : Spraying of Dicofol 18.5 EC @ 0.04% (Need based application)
7. Midge : Spraying of Endosulfan 35 EC @ 0.07% at 50% flowering (Need based application)
8. Head bug : Spraying of neem formulation NSKE @ 3% or any other commercial product of neem at soft dough stage.
9. Head worm : Spraying of HNPV @ 250 LE/ha dough stage on threshold basis
10. Mechanical collection of earhead pests i.e. midge, bugs and worms

Module-II

1. Use of high seed rate @ 12 kg/ha
2. Shoot fly : Spraying of Imidacloprid (confidor) 200 SL @ 0.005% at 12 DAE
3. Stem borer : Spraying of neem formulation NSKE @ 3% at 21st DAE and 44-48 DAE
4. Mite : Spraying of dicofol 18.5 EC @ 0.04% (Need based application)
5. Midge : Spray of Endosulfan 35 EC @ 0.075% at 50% flowering (Need based application)
6. Head bug : Hand collection of bugs giving full pressure using polythene bag containing a cotton swab soaked in 2 ml of Ethyl acetate or Benzene
7. Head worms : Release of *Trichogramma chilonis* @ 2 lakh/ha on threshold basis.

→ **Chemical control of shoot fly and stem borer by seed treatment (2nd PPSC of NAU, 2005-06)**

Under South Gujarat conditions, following insecticides are recommended as a seed treatment for the control of shoot fly and stem borer in sorghum

1. Seed soaking in solution of endosulfan @ 0.07% + $CaCl_2$ @ 2% for 8 hours (CBR 1:50.87)
2. Thiamethoxam 70 WS @ 2 g ai/kg seed (CBR 1:50.58)
3. Thiamethoxam 35 FS @ 2 g ai/kg seed (CBR 1:41.56)

→ **Low cost ecofriendly IPM module for the control of sorghum pests (2nd PPSC of NAU, 2005-06)**

For the control of sorghum shoot fly and stem borer any one of the following IPM modules is recommended for the farmers of South Gujarat.

1. Normal sowing with normal seed rate @ 8 kg/ha + seed soaking for 8 hours in solution of endosulfan @ 0.07% + $CaCl_2$ @ 2% + whorl application of carbofuran 3G @ 7.5 kg/ha at 30 DAE (CBR 1:25.65)
2. Late sowing (15 days late) with high seed rate @ 10 kg/ha + seed soaking for 8 hours in solution of endosulfan @ 0.07% + $CaCl_2$ @ 2% + whorl application of carbofuran 3G @ 7.5 kg/ha at 30 DAE (CBR 1:22.52)

→ **Chemical control of sorghum mite *Oligonychus indicus* (8th PPSC of NAU, 2011-12)**

Sorghum crop grower of South Gujarat are recommended to spray propergite 0.06% (Net BCR 1:5.5) or dicofol 0.04% (Net BCR 1:9.1) (two spray) at the initiation of sorghum mite.

→ **Chemical control of sorghum shoot fly and stem borer (14th PPSC of NAU, 2017-18)**

Sorghum growers of South and North Gujarat are advised to treat seeds with thiamethoxam 30 FS @ 3g/kg seeds before sowing or treat seeds with thiamethoxam 30 FS @ 3g/kg seeds before sowing alongwith spraying of Neem base pesticide 1500 ppm @ 35ml/10 lit .of water after 30 days of emergence of crop to manage the sorghum shoot fly and stem borer.

→ **Evaluation of different oils against sorghum shoot fly(16th PPSC, 2020)**

Sorghum growing farmers of south Gujarat are advised to spray Neem oil 0.5 % or Karanj oil 0.5 % (50ml + 3 g detergent /10 lit water) at 7 and 17 days after emergence of crop for effective management of sorghum shoot fly.

→ **To assess the crop loss due to insect pests and diseases in sorghum(16th PPSC, 2020) [Only scientific community]**

The avoidable yield loss due to insects *viz.,* shoot fly and stem borer and due to disease *viz.,* grain mold and sugary disease was anticipated up to 50.00 per cent in sorghum.

Crop Protection (Pathology):

(1) <u>Sugary Disease</u>

1978

(A) 20th July sowing were found the most suitable time for escaping from or minimizing sugary infection and also harvest significantly higher grain and fodder yield.

(B) The two sprays of Ziram 0.2% i.e. first at boot leap stage and second at 50% flowering with Carbaryl 0.25% could reduce the sugary infection to considerable extent and simultaneously give significantly higher grain and fodder yield.

1999

(C) (34th PPSC of GAU) Hexaconazole 5 EC @ 0.1% or neem fresh leaves extract @ 15% or garlic extract @ 15% at emergence of flowering and 10 days after first spray for effective management of sugary disease in sorghum.

2015 [Only scientific community]

(D) (11th PPSC of NAU) For effective and economic management of sorghum ergot can be done with two sprays of Hexaconazole 5% SC @ 0.005% at an interval of 15 days commencing from 15 days after emergence of earhead.

(2) <u>Grain Mold.</u>

1978

(A) Two sprays of Maneb 0.2% after flowering first immediately after rains and second spray after 10 days if wet cloudly weather continue help in reducing head mold infection effectively second best choice for head mold is Captan 0.2% + Aureofungin 200 ppm.

1991

(B) (26th PPSC of GAU) Two sprays of 0.2% thiram + 0.05% Carbendazim or 0.2% Mancozeb + 0.2% captan or 0.2% captan + 200ppm Aureofungin. The first spray should commence at the completion of flowering and the second milk stage.

2015 [Only scientific community]

(C) (11th PPSC of NAU) For effective and economic management of grain mold in sorghum is done with three sprays of Carbendazim (12%) + Mancozeb (63%) @ 0.2% at an interval of 15 days commencing from 15 days after emergence of earhead.

(3) <u>Charcoalrot</u>

1978

(A) Soil application of Thiram (@4.5-5.0 kg/ha) at sowing three helps in reducing the charcoal rot infection to a considerable extent, result in higher grain and fodder yield of sorghum.

(4) <u>Biofertilizers</u>

1994

(A) (29th PPSC of GAU) For obtaining higher sorghum grain and fodder yields, seed inoculation either with Azospirillum ASA1 or Azotobacter ABA1 each having 10^8 viable cells /g (200g culture/10kg seeds) alongwith the recommended dose of 40kg N/ha is recommended for marginal farmers of South Gujarat.

1998

(B) (33rd PPSC of GAU) Farmers of South Gujarat Zone (AES II) growing sorghum are advised to coat seeds with PSM strain PBA16 (Bacillus coagulans) having 10^8 CFU/g carner @ 30g culture/kg seeds before seeding to save 40kg P_2O_5/ha and to get higher grain and Stover yield.