

TECHNICAL PROGRAMME 2014-15

I. COLLECTION, CONSERVATION, CATALOGUING AND EVALUATION OF GENETIC RESOURCES OF TUBER CROPS

Exploring the biodiversity in tropical tuber crops from the unexplored areas in the different regions for collecting germplasm having unique character genes for quantitative and qualitative traits, particularly for high yield and tolerance/resistance to biotic and abiotic stress.

Centres: All participating Centres

II. TESTING OF GENETIC RESOURCES AT VARIOUS AGRO CLIMATIC ENVIRONMENTS

II.1.Cassava

II.1.1. IET on K-efficient Cassava lines

Centres: Yethapur, VR Gudem, Imphal, Thiruvananthapuram

Entries: TCa14-1, TCa14-2, TCa14-3, TCa14-4, TCa14-5, TCa14-6, TCa14-7, TCa14-8, SreeAthulya, Local

Available K status of soil may be analysed before starting the trial.

Fertilizers: No K fertilizers while apply N and P as per recommendations.

II.1.2. IET on cassava for culinary use (2013) (2ndyear)

Centres: Thiruvananthapuram, Imphal&Jagdalpur

Entries: TCa 13-1, TCa 13-2, TCa 13-3, TCa 13-4, TCa 13-5, TCa13-6, TCa13-7, SreeVijaya and M 4 (control)

II.1.3. URT on short duration cassava varieties (2012) (1stYear)

(To be harvested at 6 months)

Centres: Thiruvananthapuram, Yethapur, VR Gudem

Entries: TCa12-3, TCa12-5, TCa12-6, TCa12-7, TCa12-9, TCa12-10, Sree Jaya, Local

II.1.3. MLT on short duration cassava varieties (2009) (1st Year)

Centres: Imphal

Entries: Sree Prakash, Sree Jaya, Local

II.1.4. MLT on Cassava mosaic resistant varieties (2011) (1st Year)

Centres: Dapoli, Yethapur, Thiruvananthapuram & VR Gudem

Entries: TCMS-1, TCMS -2, TCMS-5, TCMS-7, H -226, SreePadmanabha , local

II.2.Sweet potato

II.2.1. IET on sweet potato for weevil resistance (2012) (2nd Year)

Centres: Bhubaneswar, Thiruvananthapuram, Kalyani, Dholi, Rajendra Nagar

Entries: TSp12-1, TSp12-2, TSp12-3, TSp12-4, TSp12-5, TSp12-6, TSp12-7, TSp12-13, TSp12-14, Kishan, Local

II. 2.2. IET on sweet potato (2012) (2nd Year)

Centres: Kalyani, Barapani & Dharwad

Entries: TSp12-4, TSp12-5, TSp12-6, TSp12-7, TSp12-8, TSp12-9, TSp12-10, TSp12-11, TSp12-12, SreeBhadra, Local

II.2.3. MLT on orange fleshed sweet potato (2009) (1st Year)

Centres: Dharwad, Navsari, Udaipur

Entries: Kamal Sundari, 440038, 440127, ST-14, Gouri, Local

II.2.4. MLT on orange fleshed sweet potato (3rd Year)

Centres: Imphal,

Entries: SV-362, CIPSWA-2, NFSP-1, Gouri

II.3. Yams

II. 3.1. IET on Greater Yam (2014) (1st year)

Centres: Thiruvananthapuram, Dapoli, Udaipur, Jagdalpur, Imphal, Jorhat, Kovvur

Entries: TGy14-1, TGy14-2, TGy14-3, TGy14-4, TGy14-5, TGy14-6, TGy14-7, TGy14-8, TGy14-9, TGy14-10, TGy14-11, TGy14-12, TGy14-13, SreeKarthika, local

II. 3.2. IET on *Dioscorea bulbifera* (2013) (2nd Year) (IET Db-13)

Centre: Jagdalpur, Ranchi, Dapoli

Entries: TDb 13 -1, TDb 13 -2, TDb 13 -3, TDb 13 -4, TDb 13 -5, TDb 13 -6, TDb 13 -7, TDb 13 -8 TDb 13 -9 and TDb 13 -10, Local

II. 3.3. IET on greater yam (2012) (2nd Year)

Centre: Trivandrum, Bhubaneshwar, Jagdalpur, Kovvur & Udaipur

Entries: TGy12-1, TGy12-2, TGy12-3, TGy12-4, TGy12-5, TGy12-6, TGy12-7, TGy12-8, TGy12-9, SreeKarthika, Local

II.3.4. URT on greater yam (2nd Year)

Centres: Imphal, Jorhat, Navsari, Jagdalpur

Entries: IGDA-2, Da-25, IGDA-4, Da-199 (SreeKarthika), Local

II. 3.5. MLT on Lesser Yam

Centres: Jorhat, Ranchi

Entries: RAU-2, De-17, De-96, SreeLatha, Local

II. 4. Colocasia

II. 4.1. IET on Colocasia (2012) (2nd Year)

Centres: Kalyani, Barapani, Dholi, Ranchi, Coimbatore & Port Blair

Entries: TTr12-1, TTr12-2, TTr12-3, TTr12-4, TTr12-5, TTr12-6, TTr12-7, TTr12-8, Mukthakesi, Local

II. 4. 2. IET on Swamp Taro (2013) (1st Year)

Centres: Jorhat, Kalyani, Imphal

Entries: BCST-1, BCST-3, BCST-5, BCST-13, BCST-14, AAUST-1, AAUST-2, AAUST-3, CAUST-1, CAUST-2

II.4.2. MLT on Colocasia (Bunda) (1st Year)

Centres: Jagdalpur, Kalyani

Entries: BCB-2, IGB-5, NDB-3(National check), Local

II. 4.3. MLT on *Colocasia* (Taro) (2ndYear)

Centres: Jagdalpur, Dholi, Barapani

Entries: AAU Col- 46, IGCOLE-9, ML-2, SreeReshmi, Local

II.5. Tannia

II.5.1.IET on Tannia

Centres: Rajendranagar, Jorhat, Thiruvananthapuram, Imphal Kalyani, Jagdalpur

Entries: TTn14-1, TTn14-2, TTn14-3, TTn14-4, TTn14-5, TTn14-6, TTn14-7, TTn14-8, TTn14-9, TTn14-10, local

II.6. Elephant foot yam

II.6.1. IET on Elephant foot yam (1st year)

Centres: Navsari, Trivandrum & Udaipur

Entries: TEy12-1, TEy12-2, TEy12-3, TEy12-4, TEy12-5, TEy12-6, Sree Padma & Gajendra

II. 6.2. MLT on elephant foot yam (2nd Year)

Centres: Kalyani, Kovvur, Coimbatore, Jagdalpur

Entries: BCA-3, Appakkudal local, Gajendra and AC-14, Local

II. 7. Yam bean

II. 7.1. IET on Yam bean

Centres: Bhubaneswar, Dholi, Kalyani

Entries: TYb 14-1, TYb 14-2, TYb 14-3, TYb 14-4, TYb 14-5, TYb 14-6, TYb 14-7, TYb 14-8, TYb 14-9, TYb 14-10, TYb 14-11, Check

II.8. Collection and conservation of minor tuber crops available in the respective location of the centres

Centres: All centres

III. AGRO TECHNIQUES

III. 1. Intercropping tuber crops in sapota/amla/mango orchards

Centre: Dharwad

III. 2. Study on Phenology of tuber crops in different agro-climatic zones

III. 2.1. Cassava

Centres: Thiruvananthapuram, Yethapur, Navsari, Port Blair, Imphal, Dapoli, VR Gudem

Varieties: 2 (H-226, SreeVijaya)

III. 2.2. Sweet Potato

Centres: Dholi, Ranchi, Dharwad, Hyderabad, Kalyani, Faizabad, Jagdalpur, Udaipur, Bhubaneswar

Varieties: 2 (SreeBhadra & local)

III. 2.3. Elephant foot yam

Centres: Thiruvananthapuram, Dholi, Ranchi, Navsari, Dharwad, Kovvur, Coimbatore, Kalyani, Faizabad, Bhubaneswar

Varieties: 2 (Gajendra, local)

III. 2.4. Taro

Centres: Thiruvananthapuram, Coimbatore, Rajendranagar, Kalyani, Faizabad, Port Blair, Barapani, Imphal, Jorhat

Varieties: 2 (Mukthakeshi & local)

III. 2.5. Greater yam

Centres: Thiruvananthapuram, Jagdalpur, Jorhat, Kovvur

Varieties: 2 (SreeKeerthi & local)

III. 3. Site specific nutrient management studies

Treatments:

- 1) Recommended dose of NPK as per CTCRI package
- 2) Nutrients based on soil test data
- 3) Zero N, P and K based on soil test
- 4) Zero P, N and K based on soil test
- 5) Zero K, N and P based on soil test
- 6) No added fertilizers

III. 3.1. Cassava

Centres: Yethapur & VR Gudem

Variety: SreeVijaya

III. 3.2. Elephant foot yam

Centres: Coimbatore, Dholi, Kovvur, Kalayani & Navsari

Variety: Gajendra

III. 4. Farming system studies in NE region and tribal areas

Centres: Ranchi, Bhubaneswar, Jagdalpur, Jorhat, Barapani, Imphal, Port Blair

III. 5. Micronutrient studies in Tuber Crops

III. 5.1. Cassava

Centres: Yethapur, VR Gudem, Kalyani, Imphal, Dapoli

Treatments:

1. POP recommendation (NPK+FYM) specific to the location
2. POP + Soil application of $MgSO_4@20 \text{ kg ha}^{-1}$
3. POP + Soil application of $ZnSO_4@12.5 \text{ kg ha}^{-1}$
4. POP + soil application of Borax@ 10 kg ha^{-1}
5. POP + $FeSO_4$
6. POP+ $MgSO_4+Zn SO_4+Borax$
7. POP+ $MgSO_4+Zn SO_4+Borax+ FeSO_4$
8. Absolute control

$MgSO_4$, $ZnSO_4$ and borax may be applied after top dressing of NPK fertilizers and within 2 months of planting cassava.

FeSO₄ may be given as stake dipping for 15 minutes and foliar application (0.5% FeSO₄ solution) 3-4 times at weekly intervals on appearance of the symptoms

Design: RBD

Replication: 3

III. 5.2. . Sweet potato

Centres: Dharwad, Rajendranagar, Kalyani, Dholi, Udaipur, Ranchi

Treatments:

T1: Recommended dose of FYM and NPK

T2: Recommended dose of FYM and NPK + Soil application of MgSO₄ @ 20 kg/ha after top dressing

T3: Recommended dose of FYM and NPK + Soil application of Borax @ 1.5 kg/ha after top dressing

T4: Recommended dose of FYM and NPK + Dip the cuttings in 2-4% zinc sulphate ZnSO₄·7H₂O for 15 minutes before planting+ foliar spraying of 1.5% zinc sulphate heptahydrate solution after top dressing.

T5: Recommended dose of FYM and NPK + Mg+B+Zn treatments

T6: Absolute control

Design: RBD

Replication: 4

Observations

1. Initial nutrient status of the soil (pH, organic carbon, available N,P,K, Ca, Mg, Fe, Zn, B)
2. Biometric characters of the plant (plant height, stem girth, number of fallen and retained leaves) at 3,6 MAP and at harvest for cassava and 2, 3 MAP and at harvest.
3. Tuber yield and yield attributes (number of tubers, tuber length, tuber girth) at harvest
4. Tuber quality attributes (cyanogenic glucosides, starch , tuber dry weight)
5. Economic parameters. (cost of cultivation, gross income, net income, net profit, BC ratio)

IV. PESTS AND DISEASE MANAGEMENT

IV.1. Integrated management of sweet potato weevil

Centres: Dharwad, Rajendranagar, Kalyani, Dapoli, Dholi, Udaipur, Ranchi

Treatment -01

- Dipping the planting material in 0.02% chlorpyrifos (20 EC) for 10 min.
- Earthing up along with weeding and fertilizer application
- Intercrops sweet potato with local crop* (2:1 ratio)
- Spray the biopesticide *Nanma* at 15, 30, 45, 60, 75 DAP
- Timely harvest

Treatment -02

- Dipping the planting material in 0.02% chlorpyrifos (20 EC) for 10 min.
- Earthing up along with weeding and fertilizer application
- Incorporation of cassava leaf/or available leaf (2-3 kg per mount) at 30 DAP
- Spray the biopesticide *Nanma* at, 45, 60, 75 DAP
- Timely harvest

Treatment -03

- Dipping the planting material in 0.02% chlorpyrifos (20 EC) for 10 min.
- Earthing up along with weeding and fertilizer application
- Spray 0.02% chlorpyrifos (20 EC) at 30 & 60 DAP
- Spray *Nanma* at, 45, 75 DAP
- Timely harvest

Treatment -04

- Earthing up the ridges to avoid cracks in the ridges.
- Spray the biopesticide *Nanma* at, 30, 45, 60, 75 DAP
- Timely harvest

Treatment -05

- Dipping the planting material in 0.02% chlorpyrifos (20 EC) for 10 min.
- Earthing up along with weeding and fertilizer application
- Spray chlorpyrifos (20 EC) 30, 60 DAP
- Timely harvest

No of treatment- 5; Replication 04; No. of Plots- 20;

Gross Plot size- 4.8 x 1.4 m (6.72 sq.m)

Net plot size: 3.6 x 1 (3.6 sq m)

Spacing (60 x 20 cm)

No. of plants in net plot- 30

*Local crop: coriander/ garlic

Observations to be taken

1. Incidence of weevil

Randomly select 10 plants per replication and observe the collar region (the region just above the ground level) for weevil infestation.

Observations are to be taken on 30, 60 DAP and at harvest. Plants need not be uprooted for 30 & 60 DAP.

Sore	Intensity of infestation
0	No infestation
1	< 10%
2	11-20%
3	Over 20% (the collar region is highly swollen due to infestation .)

2. Tuber damage by weevil (Ebregt et al 2007)

On harvest segregate the tubers based on weevil infestation and give scores as given below and take weight

Score	Intensity of infestation
0	No infestation
1	< 10% (usually seen at the neck of the tuber)
2	11-20% (The infestation spreads from neck region to the middle of the tuber)
3	Over 20% (The entire tuber will be infested)

IV. 2. Evaluation of *Colocasia* entries for *Phytophthora* leaf blight resistance/ tolerance.

Centres : Kalyani, Dholi, Dapoli, Rajendranagar

Entries : TC bl 12-1, TC bl 12-2, TC bl 12-3, TC bl 12-4, TC bl 12-5, TC bl 12-6, TC bl 12-7, Mukthakeshi, Telia

IV.3. Mangement of Yam anthracnose

Centres : Rajendranagar, Udaipur, Jagdalpur

Design: RBD

No. of treatments : 8

Replication : 3

Plot size : 4.5 x4.5 m

No. of plants in net plot : 9

Treatments

T1: Standard package of practices (control)

T2: Healthy tuber + Soil application with Trichoderma

T3: Healthy tuber +Tuber treatment with Trichoderma

T4: Healthy tuber + spray (Carbendazima.i 0.05%)

T5: Healthy tuber + Soil application with Trichoderma + Tuber treatment with Trichoderma

T6: Healthy tuber + Soil application with Trichoderma + Tuber treatment with Trichoderma + Spray

T7: Healthy tuber + Soil application with Trichoderma + spray

T8: Healthy tuber +Tuber treatment with Trichoderma + Spray

- Soil treatment with *Trichodermaasperellum* @ 50 g of 10^7 cfu g^{-1} two times one at the time of planting and another at third month
- Tuber treatment with *Trichodermaasperellum* @5 g in fresh cow dung slurry per kg of tuber

- Foliar spraying of Carbendazim @0.05% (1g Bavistin/ litre) three times at 15 days interval from third month after sprouting/ initiation of symptom
- Trichoderma culture will be supplied from CTCRI

Standard package of practices:

Use Healthy tubers for planting

Spacing: 90cm x90 cm

Fertilizer: 80: 60:80 kg NPK/ ha

IV.4.Survey and surveillance of pests and diseases of root and tuber crops

Centres: All Centres

V. PLANTING MATERIAL PRODUCTION

Centres: All Centres

Quality planting material production and distribution

VI. RESEARCH EXTENSION INTERFACE

Centres: All Centres

VI.1. Popularization and Demonstration of tuber crops in Urban & Peri- urban and non-traditional areas for food and feed.

VI.2.Value addition and Women empowerment- Demonstrations

VI.3. Documentation of status of tuber crops in India

VI. 4.Demonstration plots of White Yam

Centres: Imphal, Ranchi, Jagdalpur, Dapoli