SCHOOL OF CROP HEALTH BIOLOGY RESEARCH

AIM:

To understand the biology, ecology of insect pests/pathogens/weeds/host plants to harness potential yield in crop plants

THRUST AREAS:

- Molecular systematics of pests/pathogens, life cycles
- Epigenetics of adaptations (modes of survival, perpetuation)
- Host defense responses in crops to complex biocontrol endophyte pathogen host plant interactions, pest surveillance and breaking the weak links in key pests by understanding the biology of biotic stresses.
- Understanding the mechanisms involved in biotic stresses and crop plants for better health of crop plants.

MAJOR PROGRAMMES:

- Ecological foundation of pest dynamics and their control in emerging production systems.
- Characterization and sustainable use of pathogen and Pest genetic resources (PPGR) for biotic stress management.
- Interaction between abiotic and biotic stresses.

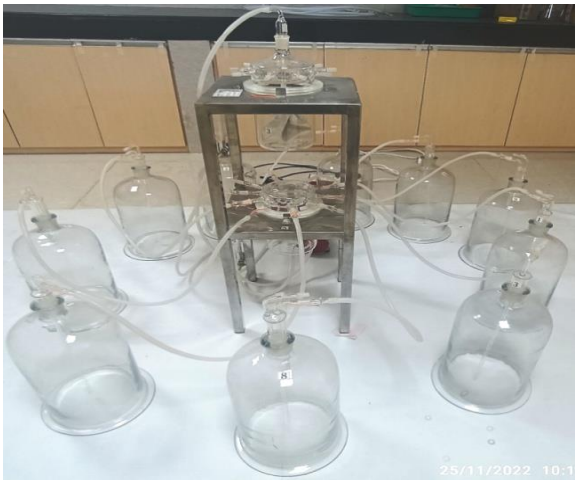
RESEARCH FACILITIES

Few scientific facilities particularly facility for trapping plant volatiles induced by external stressors including crop herbivores, facility for mass production of egg parasitoid, *Trichogramma* spp., open top chamber for conducting climate change related experiments and laboratory facility for handling microbe in One Health perspective have been created in the School of Crop Health Biology Research to undertake research in Chemical Ecology and One Health related research under climate change condition.

LAB FACILITIES

DYNAMIC PLANT VOLATILE TRAPPING UNIT

A facility has been created in SCHMR to trap volatiles induced by various stressors in crops

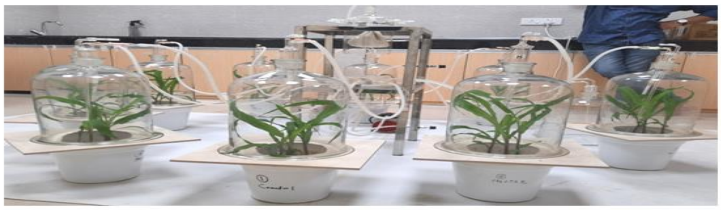


Plant Volatile Trapping Unit

PLANT VOLATILE REPOSITORY

Crops

1. Rice
2. Wheat
3. Maize
4. Chickpea
5. Cowpea
6. Green gram
7. Black gram
8. Soybean
9. *Lathyrus*



Insects

1. Yellow stem borer
2. Leaf folder
3. Brown planthopper
4. Pink stem borer
5. Pod borer
6. Fall armyworm
7. Maize aphid
8. Pulse aphid
9. Whitefly
10. Thrips

Nilaparvata lugens

Spodoptera frugiperda

Helicoverpa armigera

Lathyrus thrips

Cnaphalocrocis medinalis

Sesamia inferens

Rhopalosiphum maidis

White fly

TRICHOGRAMMA PRODCTION UNIT

***Trichogramma* Production Facility**

Native *Trichogramma*

Chemical Ecology and One Health Laboratory

Distillation Units

Autoclave

Germplasm storage cabin

Refrigerator for volatiles

-20^{0}C refrigerator

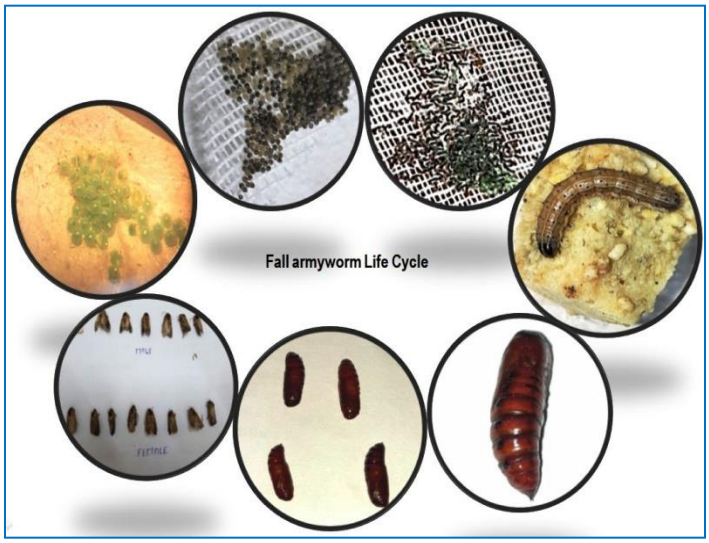
Water bath

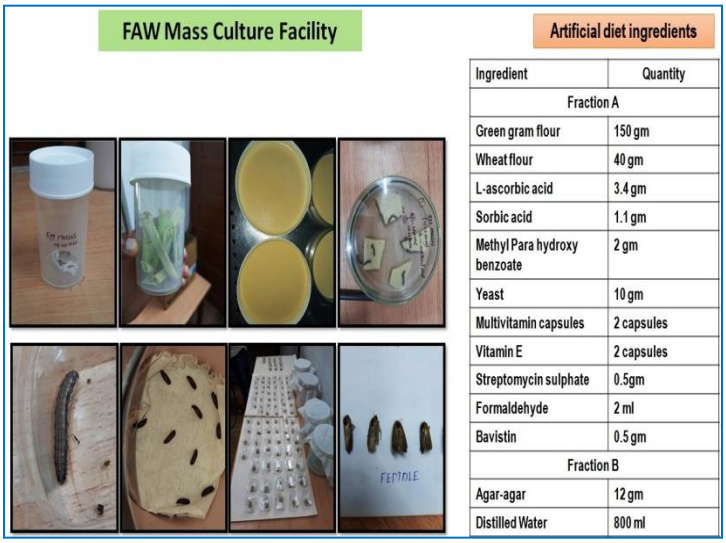
Oven

Microtome

Incubator Shaker

Fall armyworm Mass Culture Facility





Artificial diet ingredients

Ingredient	Quantity
Fraction A	
Green gram flour	150 gm
Wheat flour	40 gm
L-ascorbic acid	3.4 gm
Sorbic acid	1.1 gm
Methyl Para hydroxy benzoate	2 gm
Yeast	10 gm
Multivitamin capsules	2 capsules
Vitamin E	2 capsules
Streptomycin sulphate	0.5gm
Formaldehyde	2 ml
Bavistin	0.5 gm
Fraction B	
Agar-agar	12 gm
Distilled Water	800 ml

Smart Class Room with Interactive Board

Open Top Chamber for Climate Change Research

Studies on the effect of ongoing climate change on crop production vis-à-vis different biotic stresses in agriculture have been initiated at ICAR-National Institute of Biotic Stress Management, Raipur. The aim of the facility is to study the effect of various climate change parameters like elevated CO_2, elevated temperature etc. on plant growth parameters, biology and yield parameters of biotic stress. In order to study the impact of climate change, open top chamber (OTP) facility was established recently. OTC is the most basic facility required to undertake the studies on real time effect of climate change parameters on various aspects of crop production and their influence on biotic stress. The increasing CO_2 concentration of atmosphere and associated predictions of global warming can be simulated to determine the likely effects of future elevated CO_2 and temperature levels on biotic stress. OTC is an innovative and cost effective approach to investigate effects of elevated CO_2, temperature and humidity on the growth dynamics and yield response of plants as well as the on the associated biotic stresses. In this approach, CO_2 gas is supplied to the chambers through CO_2 gas cylinders and maintained at set levels using manifold gas regulators, pressure pipelines, solenoid valves, sampler, pump, CO_2 analyzer and PC linked supervisory control and data acquisition (SCADA). The data generated by OTCs are more realistic for impact assessment analysis of rising climatic parameters on plants and associated biotic stresses for developing models to predict the responses for future climatic conditions.

OTC Chambers with Climate Control Facility

Inauguration of open top chamber facility on February 18, 2023 by honourable Director General, ICAR, New Delhi at ICAR-NIBSM