

## **AIP-3430: BIOCHEMICAL CHARACTERIZATION AND EVALUATION OF PROMISING SILKWORM GERMPLASM THROUGH ENZYME KINETICS TO SCREEN GENETIC HARDINESS AMONG SILKWORM GENETIC RESOURCES**

**Period:** April, 2009 - March, 2012

**Investigators:** P. Somasundram, K. Ashok Kumar and N. Balachandran

### **Introduction:**

The silkworm genetic resources with heat stable esterase and protease isozyme markers against chemical inhibitor and their association was studied through enzyme kinetic properties to identify thermo-tolerant/hardy breeds in the silkworm germplasm stocks. It was also attempted to catalogue the database to document these identified hardy genotype/s.

### **Objectives:**

- To study the kinetic properties of enzymes in promising silkworm germplasm.
- To identify the hardy genotypes based on kinetic value.
- To catalogue the database on kinetic values against each breed and document hardy genotypes

### **Outcome:**

- ❖ Among the MV and BV silkworm accessions were screened for inhibition studies on esterase and protease enzymes showed that a minimum inhibition was observed in multivoltine race viz., Pure Mysore ( 3.33 % in esterase and 3.85 in protease enzyme), whereas it was high in LMP ( 9.41 % in esterase and 9.15% in protease enzyme). Similar studies in bivoltine indicated a minimum inhibition in Meigitsu (2.62% in esterase and 4.49% in protease enzyme), while it was found higher in Sanish E1 (P) (8.88% in esterase and 9.33 % in protease enzyme).
- ❖ The multivoltine silkworm accessions exhibited higher resistance (55.55%) to chemical inhibitors by minimum inhibition activity of the esterase and protease enzymes compared to bivoltine accessions (27.4%).

<b>% Inhibition</b>	<b>Accessions/Races</b>	<b>No. of accessions</b>
0 to 5% level	BMI-0001 (Pure Mysore 2), BMI-0017 (Nistari), BMI-0018 (Nistari (M)), BMI-0043 (MW-13), BME-0049 (NK-4 )	<b>5</b>
(Higher resistance)	BBE-0005 (Meigitsu), BBE-0009 (B-40), BBE-0010 (J-112), BBE-0012 ( Yakwei), BBI-0286 (SPC-1), BBI-0324 (CSR-3 (SL)), BBI-0359 (CSR-27), BBI-0048 (JD-6)	<b>8</b>

**Recommendations/ Utilization:**

- ✓ Biochemical characterization and evaluation of silkworm genetic resources through enzyme inhibition activities is an important biochemical tool for screening of silkworm races/breeds with genetic hardiness.
- ✓ Enzyme inhibition technique using chemical inhibitor PMSF specific to esterase and protease enzymes associated with hardiness was developed and used to identify the resistance silkworm genetic resources for its use by researchers and breeders to choose hardy parental race/breeds for silkworm improvement.
- ✓ The higher resistance group of Multivoltine silkworm accessions, Pure Mysore, Nistari, Nistari (M), MW-13 and NK-4 and Bivoltine, Meigitsu, B-40, J-112, Yakwei, SPC-1, CSR-3 (SL), JD-6 and CSR-27 silkworm accessions have been identified as hardy races can be use by breeders for future crop improvement programme.



CSB-CSGRC, HOSUR