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Highlights

Highlights of the findings

- ❖ Tea, *Camellia sinensis* is the main agro-industry of North-East India including the Dooars, Terai and Darjeeling foothill region.
- ❖ Insects specially lepidopteran tea pests such as loopers (*Buzura suppressaria* and *Hyposidra talaca*) cause major defoliations of young leaves, where as red slug caterpillars (*Eterusia magnifica*) mainly attack the mature tea leaves. Very young tea leaves are rolled-up as nest by the tiny caterpillars of *Caloptilia theivora*.
- ❖ Entomopathogenic bacteria that naturally infect and kill the pests were surveyed, isolated from caterpillar pests, characterized, then bioassayed and field tested to determine their killing efficacy.
- ❖ For knowing the natural occurrence of the entomopathogenic bacteria, population sampling of the host (pest) insects (*B. suppressaria*, *H. talaca*, *C. theivora* and *E. magnifica*) was done randomly from the tea plantations of Darjeeling foothill region and the adjoining plains (Terai and the Dooars).
- ❖ High rate of bacterial infection was recorded in all the concerned pests during the monsoon months.
- ❖ After satisfying Koch's postulate test, the bacteria were characterized following morphological, biochemical and physiological procedures.
- ❖ Characterization revealed presence of three bacterial strains, *Bacillus* sp. BS01 from *B. suppressaria* and *Bacillus* sp. HT01 and *Bacillus* sp. HT02 from *H. talaca* population.
- ❖ In case of *Caloptilia theivora* four *Bacillus* strains (*Bacillus* sp. CT01, *Bacillus* sp. CT02, *Bacillus* sp. CT03 and *Bacillus* sp. CT04) were isolated. Besides this, a non-spore forming strain of *Enterobacter* (*Enterobacter* sp. DD01) was isolated.

- ❖ From *Eterusia magnifica* caterpillars, a bacterial strain named *Bacillus* sp. RS01 was isolated.
- ❖ Cross-infectivity to other looper species was registered for *Bacillus* sp. BS01, HT01 and HT02. But none of the bacterial isolates were infective to *Bombyx mori nistari*.
- ❖ The isolated bacterial strains (*Bacillus* sp. BS01, HT01, HT02, CT01, CT02, CT03, CT04, RS01 and *Enterobacter* sp. DD01) from the tea lepidopterans showed good killing efficacy, based on laboratory bioassay.
- ❖ The findings reveal the spectrum of diversity of the bacterial entomopathogens of lepidopteran pests of tea for the first time.
- ❖ Field assay of only the most pathogenic strains, having low LC₅₀ values, were tried.
- ❖ *Bacillus* sp. HT01 proved effective in controlling looper populations (*Hyposidra talaca*) within seven days of spray.
- ❖ *Bacillus* sp. CT04 was effective in significantly reducing the leaf roller population (*Caloptilia theivora*) within seven days at 4000µg/ml and 3000µg/ml concentrations.
- ❖ *Bacillus* sp. RS01 in field at high concentrations i.e., 12,000µg/ml and 11,000µg/ml proved effective in reducing red slug caterpillar population (*Eterusia magnifica*) within 7 days
- ❖ It is recommended that the field applied strains of *Bacillus* (HT01, CT04 and RS01) that have proved their killing potential against their concerned pests may be taken up for further formation, toxicity testing and development as commercial biopesticides.

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