ORGANISM (ORGA)

BCH-ORGA-SCBD-45614-11

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Organism information

Scientific name

Bacillus thuringiensis

Taxonomic Classification

Kingdom	Bacteria
Phylum	Firmicutes
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	Bacillus
Species	thuringiensis

Common name(s)

Bt	EN
Bacillus	EN
BACTU	EN

Type of organism

Bacteria

Characteristics related to biosafety

Centre(s) of genetic diversity

Bacillus thuringiensis was first discovered in 1901 by Japanese biologist Shigetane Ishiwatari. In 1911, *B. thuringiensis* was rediscovered in Germany by Ernst Berliner, who isolated it as the cause of a disease called Schlaffsucht in flour moth caterpillars. In 1976, Robert A. Zakharyan reported the presence of a plasmid in a strain of *B. thuringiensis* and suggested the plasmid's involvement in endospore and crystal formation.	EN

Habitat range

Bacillus thuringiensis (or Bt) is a Gram-positive, soil-dwelling bacterium. It also occurs naturally in the gut of caterpillars of various types of moths and butterflies, as well as on the dark surfaces of plants.	EN

Known pathogenicity and/or allergenicity

Bacillus thuringiensis produces crystals of toxin that are lethal to larval stages (caterpillars) of the insects which belong to orders Coleoptera, Lepidoptera and Diptera, but are considered harmless to most other organisms, including humans. The spores of the bacterium and the toxic crystals that are produced in the bacterial plasmids are used in crop protection. Cry toxins have specific activities against insect species of the orders Lepidoptera (moths and butterflies), Diptera (flies and mosquitoes), Coleoptera (beetles), Hymenoptera (wasps, bees, ants and sawflies) and nematodes. Thus, *B. thuringiensis* serves as an important reservoir of Cry toxins for production of biological insecticides and insect-resistant genetically modified crops. When insects ingest toxin crystals, the alkaline pH of their digestive tract denatures the insoluble crystals, making them soluble and thus amenable to being cut with proteases found in the insect gut, which liberate the cry toxin from the crystal. The Cry toxin is then inserted into the insect gut cell membrane, forming a pore. The pore results in cell lysis and eventual death of the insect. *Bacillus thurigiensis*-based insecticides are often applied as liquid sprays on crop plants, where the insecticide must be ingested to be effective. The gene encoding the Bt toxin is commonly used in modern biotechnology to introduce the resistance to crop plants, such as maize and cotton.	EN

Common use(s)

Feed
Food

Additional Information

Other relevant website addresses and/or attached documents

? Bacillus thuringiensis - Wikipedia *(English)*

? How Does Bacillus thuringiensis Produce So Much Insecticidal Crystal Protein.pdf *(English)*

? Insecticidal Crystal Proteins of Bacilllus thuringiensis.pdf *(English)*

? Two novel strains of Bacillus thuringiensis toxic to coleopterans..pdf *(English)*

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Further Information

Questions about the Cartagena Protocol on Biosafety or the operation of the Biosafety Clearing-House may be directed to the Secretariat of the Convention on Biological Diversity.

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