

# Distribution and phylogeny of bacterial endosymbiont *Wolbachia* in the wild populations of *Bactrocera* and *Zeugodacus* sp. (Diptera: Tephritidae) from India

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Tephritid fruit flies are the serious insect pest of fruits, vegetables and flower crops. Various control strategies have been used for the control of fruit fly. *Wolbachia* is a group of obligatory, intracellular and maternally-inherited bacteria widely present in insects and has significance as an incompatible insect technique for pest control. In the present study, the wild populations of *Bactrocera* and *Zeugodacus* sp. were collected from 13 locations in India by using pheromone traps. Total genomic DNA of individual male fruit fly samples was extracted and *Wolbachia* prevalence was assessed through *Wolbachia* specific 16S rRNA gene analysis. The variable *Wolbachia* infection rates were observed in six different species of tephritid fruit fly samples obtained from different regions. The average *Wolbachia* infection was 62.9% (*Zeugodacus tau*), 57.1% (*Bactrocera dorsalis*), 52.07% (*Zeugodacus cucurbitae*) followed by 47.8% and 8.5% in *Bactrocera correcta* and *Bactrocera zonata* populations respectively. While, no infection was observed in *Zeugodacus caudatus*. Phylogenetic analysis revealed supergroup-A of *Wolbachia* is present in wild *Bactrocera* and *Zeugodacus* sp. The prevalence of *Wolbachia* and identifying strains in fruit fly species could facilitate in designing suitable pest management strategies.

**Keywords:** *Bactrocera*, endosymbionts, tephritids, *Wolbachia*, *Zeugodacus*.

them, *Bactrocera* and *Zeugodacus* are distributed throughout Asia and Australia, where they cause significant damage to agricultural and horticultural crops<sup>2-4</sup>. Fruit flies are known to have high reproductive potential, greater adaptability and invasion capacity; hence, they are an important target for area-wide pest management programmes to avert economic losses. The sterile insect technique (SIT) is an environment-friendly and species-specific method of pest control based on the release of large numbers of sterile insects in an area-wide pest management programme. This method has been successfully employed against various insect pests including tephritid fruit flies management.

Insects harbour many bacterial endosymbionts, which play an important role in the biology of insects, improvement of sterile insect's fitness and some of the bacterial endosymbionts are also explored in insect pest and vector management<sup>6-8</sup>. The endosymbiotic bacteria, *Wolbachia*, a diverse group of intracellular, obligatory and maternally-inherited bacteria present in 40–66% of arthropod species and filarial nematodes<sup>9</sup>. It is known to establish diverse symbiotic associations with their hosts, ranging from mutualism to parasitism<sup>10</sup>. *Wolbachia* has the ability to induce a number of reproductive alterations such as feminization, thelytokous parthenogenesis, male-killing, cytoplasmic incompatibility (CI) and speciation through reproductive isolation<sup>6,9,10</sup>. *Wolbachia pipiensis* is the most prevalent *Wolbachia* in insects, other arthropods and nematodes<sup>11</sup>. Significant genetic diversity exists in *Wolbachia*, and