INSECT NATURAL ENEMIES AND THEIR POTENTIAL FOR BIOCONTROL OF ASIAN LONGHORNED BEETLE

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ABSTRACT

Asian longhorned beetle (ALB) (*Anoplophora glabripennis*) is a serious pest in China. It can attack over 20 host tree species, specifically broadleaf species. For biocontrol purposes, we initiated investigations of its insect natural enemies.

Compared with other longhorned beetles, few natural enemies of ALB have thus far been identified. This may be one reason for the outbreaks of ALB over large areas. To date, we have not found any egg parasitoids. There are, however, larval parasitoids: *Dastarcus longulus* Sharp (Coleoptera: Colydiidae), *Scleroderma guani* Xiao et Wu (Hymenoptera: Bethylidae), *Bullaea* sp. (Diptera: Tachinidae), and *Megarhyssa* sp. (Hymenoptera: Ichneumonidae); and pupal parasitoids: *D. longulus, S. guani*, and *Aprostocetus* sp. (Hymenoptera: Eulophidae). *D. longulus* and *S. guani* are the most important among these natural enemies of ALB, as they parasitize both larvae and pupae.

D. longulus, in many areas, has been reported to have parasitization rates of 50-70%. Female *D. longulus* lay eggs in frass and sawdust in host gallery or on the host gallery wall. First instar larvae possess thoracic legs and crawl about in search of a host. Upon finding an acceptable host, the larvae lose their thoracic legs and attach to the body of its host for feeding. It is an ectoparasite, feeding singly or gregariously on its host (1-27 individuals per host), but in all cases the host is killed. *D. longulus* is considered to have the highest potential for use in biological control of ALB.

S. guani usually parasitizes longhorned beetle species whose larvae are small, ca. 15 mm in length. It is an idiobiont ectoparasitoid. Female wasps first paralyze their host by stinging, which immobilizes the host, and then lay eggs on the host body. Larvae are gregarious while developing on their host. After hosts are consumed, mature wasp larvae spin cocoons and pupate. Parental wasps remain with their young until they have completed their development and emerged as adult wasps. Should their eggs or larvae become separated from the host,

parental wasps have been observed to return them to the host. Most female wasps are apterous. The degree days of *S. guani* is 448.89 for development from egg to adult. It can be mass reared for biocontrol. Therefore, *S. guani* has great potential for use in the biological control of ALB larvae, specifically 1st to 3rd instars.