Characteristics of Hymenoptera Parasitica (Insecta: Hymenoptera).

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Abstract

Hymenoptera Parasitica represent the richest group of Hymenoptera and insect species develop as parasitoids of many insects, playing an important role in regulating pest populations and also phytophage insects, as they can lay their eggs on or directly within their host which is always dead due to the development of the larva that feeds on it. The large number of Hymenoptera Parasitica combined with their ability to respond to the density of the populations of its hosts makes them essential to maintain ecological balance and a force that contributes to the diversity of other organisms. The objective of this bibliographic study and present the characteristics of Hymenoptera Parasitic (Insecta: Hymenoptera).

Keywords: insetics, parasitoids, biocontrol, natural enemy, Brazil.

The order Hymenoptera with potential for more than 250,000 species distributed worldwide, has more than 100,000 described (Brown 1982, Hanson & Gauld, 1995). Hymenoptera Parasitica represent the richest group of Hymenoptera and insect species; are common and abundant in all terrestrial ecosystems; develop as parasitoids of many insects, playing an important role in regulating pest populations and also phytophage insects, as they can lay their eggs on or directly within their host (egg, larva, pupa or imago) which is always dead due to the development of the larva that feeds on it. The large number of Hymenoptera Parasitica combined with their ability to respond to the density of the populations of its hosts makes them essential to maintain ecological balance and a force that contributes to the diversity of other organisms (La Salle & Gauld 1992).

About 75% of Hymenoptera Parasitica species have not yet been described. Taxonomic knowledge, only, is not enough to protect the species; ecological information, evolutionary correlations are necessary to ensure its survival.

In most terrestrial ecosystems, Hymenoptera Parasitica develop in trophic
interactions, include "key species" and have the skills to regulate the populations of their hosts. Its removal can cause the "cascading effect", where the decrease in the host population leads to the decrease in parasitoid populations, after the increase in the host population, which compete with each other and therefore also decrease in number.

Parasitoid food chains contain more than half of the known species of Metazoa (Price 1980, Strong et al. 1984, Hawkins & Lawton 1987). Hawkins & Lawton (1987) examined parasitoids associated with phytophages in Britain and found 285 species in 42 families in 6 parasitoid orders.

Biological control is the best evidence that parasitoids can regulate the size of the population of phytophages.

We understand by biodiversity the variety of organisms on the planet, including their genetic diversity. The concept is broad and includes interaction between genes, species and ecosystems (Reid & Miller 1989). These authors predicted that extinction rates over the next 25 years could be 15,000 to 50,000 species per year or 50-150 species per day (based on 10 million living species and 5-10% the extinction rate over the next 25 years). This represents an index of 1,500 to 5,000 times higher than average.

Through the few resources we have it is impossible to study all groups to know their biodiversity. We need to choose important groups or habitats to be studied with priority.

Insects constitute the group of invertebrates best represented on the planet, constituting half of the living organisms described (800,000 species) and making the greatest impact on terrestrial ecosystems. They keep the various trophic levels united; are millions of herbivores consuming plants and also millions of consumers by others who are predators or parasitoids.

Not all species have the same influence on ecosystems and according to Solbrig (1991) there are 3 categories of "key species": natural enemies (predators, parasitoids, herbivores and pathogens); and species that are a source for the survival of other decomposers.

Lepidoptera and Hymenoptera Parasitica (mainly Chalcidoidea and Ichneumonoidea) participate in many trophic chains of tropical ecosystems involving plants, herbivore insects and parasitoids. Without the controlling action of the parasitoids there would be an explosion in the herbivorous populations which would lead to a greater degradation of the plant species consumed by them; therefore, parasitoids, herbivores and plants must be kept in balance so that their diversity is not altered. Successful groups such as Lepidoptera and Hymenoptera become fragile in the face of environmental degradation, prone to extinction.

The Hymenoptera Parasitica are the most important natural regulators
responsible for most of the economic and environmental benefits produced by biological control programs and can provide subsidies for biology and conservation studies.

As biological control agents they react to the size of populations of their hosts. Its mortality action increases with the increase in the population of its hosts and decreases with the decrease of it. The two linked populations float each other in order to prevent both the mass increase and extinction of the host population.

Greathead (1986) listed 393 species of parasitoids used in biological control programs of which 344 (87%) are Hymenoptera and thanks to these we have achieved great savings in pest control programs.

Interest in biological control has grown in several countries, in part, in response to the adverse effects of chemical pesticides on the environment and biodiversity, and also due to the new international segmentation of agricultural production through the use of alternative means to the environment in order to promote the conservation and sustainable use of biodiversity.

Brazil is one of the few countries in the world that hold the so-called biological megadiversity, that is, important ecosystems, still healthy. This biodiversity can offer unique opportunity for pest control in both Brazil and other countries, due to the identification of new organisms with potential to be used in biological control.

For many agroecosystems in our country, little is known about the biodiversity and identity of species of natural enemies with the function of sustaining crop production. As a key component of global biodiversity and as a key determinant of sustainable agriculture, natural enemies should be better understood to be protected.

Currently, Brazil has many laboratories that work with biological control contributing to several programs of great success, mainly in the control of insect pests. Several recent works have questioned the safety of classical biological control and, specifically, the use of generalist natural enemies. There are many examples of introductions that have resulted in severe impacts on untargeted organisms, extinctions, biodiversity loss and imbalance of native communities.

The possible adverse effects produced by an exotic organism introduced can be summed up in: a) direct damage to beneficial organisms not targeted in the local community including other biological control agents, organisms pollinators, representatives of flora and fauna of economic, ecological and or social importance, beneficial organisms of the soil and the health of man himself, not aimed at, but also by the effects it may have on the ecosystem as a whole; b) indirect damage to the environment when reducing the abundance of a pest leading to an empty niche that may be occupied by unwanted species, especially important in the case of invasive herbs; c) conflict of interest related to the advantages and disadvantages brought to various...
groups of control of certain pests; (d) environmental pollution, when certain introduced organisms can become so abundant by bothering society; e) concerns of neighboring countries that share the same ecological region, since there are no political barriers to restrict the spread of an unwanted organism.

The great difficulty is to decide what is necessary to preserve biodiversity, since it is unfeasible to study all existing species.

Diversity in natural environments is important as a potential source for biological control projects, because we don't know what will be built in plague in the future.

The natural parasitoids of a plague are not only important to it, because the number of natural enemies found in any project can be important to the success of the program. If different species are more effective at different times of the year or on different host plants or different population densities or at the same time at different stages of hosts, then diversity is important.

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