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THE BIOLOGICAL CONTROL IN BRAZILIAN AGRICULTURE

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Brazil is the world leader in tropical Agronomy, position conquered from the second half of the last century. This position has had positive effects on livestock and crop production, the country became an importer of food to those of 1960, to important world player of agribusiness in the 21st century. The productivity of crops grown in scale almost exponentially, the production systems have multiplied and joined seeking a rapprochement with the reality of ecosystems, bringing sustainability as a permanent factor. The UN Food and Agriculture Organization (FAO) and the Organization for Economic Cooperation and Development (OECD) estimate that 40% of the increase in demand for food until the year 2050 should be remedied by Brazil.

Two examples demonstrate this new Brazilian reality. The genetic improvement of plants is a fantastic event, such as cite the cultivation of soy-been. Plant native to temperate climate had its cultivation Brazil initiated by the Rio Grande do Sul State, with latitude 32°S, today it is cultivated in Amapá State, with 0° latitude. The second is the production system of crop-livestock-integration-forest (iLPF) inserted in low-carbon agriculture or agriculture ABC, which is transforming areas with degraded pasture in production is sustainable and profitable. The same is happening with the biological control, which has evolved a lot, whether in research, and in its application in agriculture.

What is biological control? It is a way of combating pests which affect the plantations using their own natural enemies, such as insects, mites, and microorganisms. Instead of using a chemical product, whose improper use can be harmful to man and the environment, the farmer tries to destroy, or at least reduce the

presence of aggressive agent, with the aid of, for example, a small vespa or a fungus present in nature.

The biological control is an ancient practice in agriculture. The chinese used natural enemies to control pests of citrus, before Christ. But the biological control in scientific databases began in 1888, in California, where we highlight two centers of research in this area in Riverside and Berkeley. The reason for this was a serious plague that attacked the plantations of citro, known as white aphid, which is in fact a cochineal, *Icerya purchasi*. To establish the biological fighting this plague Americans were to Australia, which was the probable site of origin of the insect, and brought the (*Rodolia cardinalis*). The event was considered a success.

In Brazil, the first importation of insect with this goal was in 1921, introduced in São Paulo, it was of wasp in the United States, the *Encersia berlesei*, that parasitizing the white mealybug peach tree, but the attempt failed. Another attempt was made in 1924 due to the coffee berry borer (*Hypothenemus hampei*), a small hive beetle of African origin that attacks that culture. Researchers from the Biological Institute and a professor of the Escola Superior de Agricultura “Luiz de Queiroz (Esalq), of the São Paulo University (USP), Salvador de Toledo Piza Junior went to Africa and brought a wasp Uganda the *Prorops nasuta*, but the control of pague has not quite right. At that time had not the technique of creation. It was the time of the so-called classical biological control, in which everything was done in rudimentary form, being possible to create some insect of artisan way and without any technology.

Today Brazil ranks very well in the biological control of pests of agriculture. The sugar cane is the classic example. The State of São Paulo plant between 9 and 10 million hectares of sugar cane, almost half of this area is controlled biologically. The fight the to insect known as the sugar cane borer *Diatraea saccharalis*, and the leafhopper *Mahanarva fimbriolata* A pest that attacks the roots of the plant is done this way.

The caterpillar of the sugarcane borer is destroyed with the release of the wasp Cotesia flavipes, an insect of Trinidad and Tobago that was introduced in the country in 1971, it is used in 3.5 million hectares of sugar cane. The small wasp *Trichogramma galloi* has been used to combat the egg of the sugarcane borer in approximately 500 thousand hectares of cane. In the fight at different stages of development of these pests – egg, caterpillar, pupa and adult – can be used different natural enemies. For the control of the sugarcane spittlebug is used a fungus the *Metarhizium anisopliae.*

Another culture that has been benefiting from the biological control to combat greening, citrus. It is a disease that leaves yellow the leaves of the orange tree, drying plants. It is caused by bacteria Candidatus Liberibacter that are transmitted to the plants by a small insect, *Diaphorina citri*. The presence of greening took the citrus to apply insecticide in the orchard of 20 to 30 times a year, so rampant, to kill the insect. Now the citrus lay at the edge of baits, traps, yellow orchard with glue, which detect the moment the insect arrives at the orangery, which may then act on your fight at the right time.

In Florida, United States, practically ended the citrus greening. Americans know the biological control, but they didn't. They thought that only by improving the nutrition of the plant would be able to combat the disease. It was not enough.

However, biological control is not the answer for all pests, but can be useful and help reduce the use of chemical pesticides on crops. "Brazil is the world champion in the use of chemicals in agriculture, our farmer has this culture", says professor and researcher from (Esalq), José Roberto Postali Parra. Its exclusive use does not solve all the problems. It is a component of Integrated Pest Management (IPM), in United States, between the end of the 1960 's and early of 1970. In the early 1990, the U.S. Government stated that 75% of farmers would have to do the MIP, however, they only amounted to 4% to 8%. American farmers also have a strong culture in the use of chemical pesticides. Where the MIP is most used in Europe, especially in Holland and Spain. For Brazil the moment is favorable and should increase the use of the MIP.

The MIP is a process of phytosanitary defense that works with the balance of shares, so, it need to work with healthy seedlings, eradicate the diseased plants and apply the insecticide without exaggeration. A practice that needs to be universal and enforced in brazilian agriculture is the Agronomic Prescription, to avoid excessive application of chemical pesticides, as well as, the indication by the agronomist of the proper use of the MIP.

This is because you can't forget that Brazil is a tropical country, very favorable condition, the climatic conditions, to the proliferation of pests and diseases on agricultural production throughout the year. In temperate or cold countries the establishment of four weather stations – spring, summer, autumn and winter – help in fighting these aggressors, thus reducing the use of chemicals. The trend in this century is that more and more environmental preservation, agricultural production, forestry and follow the path of rationality.