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Agricultural Biotechnology Annual

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Report Highlights:
The Government of Honduras (GOH) has regulated biotechnology since 1998, and in September 2008 the GOH ratified the Cartagena Biosafety Protocol. Honduras is the only country in Central America that allows field trials and commercial production of biotechnology crops. Honduras has a National Committee of Biotechnology and Biosecurity (NCBB) composed of technical scientists from ten public and private institutions which evaluates requests for field trials and commercial liberation. In 2010, there were 15,774 hectares (ha.) of commercial corn production of biotechnology varieties BT (MON 810), RR (NK 603), and Herculex I in Honduras.

Section I. Executive Summary:

Honduras is the only country in Central America and one of the five countries in Latin America which allows the field testing and commercial production of biotech crops. At present, BT (MON810), Roundup Ready (RR) (NK603), and Herculex 1 are commercially produced in Honduras. Additionally, there is a pending approval for YGVTPro (MON 89034).

In 2010, there were 15,774 hectares in production of genetically modified (GM) corn in Honduras consisting of 5,325 hectares planted with BT and RR, 1,775 hectares of RR, 1,835 hectares of Herculex I and 6,839 hectares of Herculex I and RR. Preliminary data from producers indicate that the per hectare maximum traditional corn yield is 2.7 metric tons, hybrid yield is 3.6 metric tons, and GM yield is 8.0 metric tons.

Honduras' corn crop is sold within the domestic market and exported regionally, and Honduras imports corn and soybeans from the United States to supply its poultry, livestock, shrimp, and tilapia industries.

Honduras' biotechnology system is sanctioned by the Phytozoosanitary Law of the Ministry of Agriculture and Livestock (SAG) and is regulated by the Biosecurity Regulation with Emphasis in Transgenic Plants. As part of Central American-Dominican Republic Free Trade Agreement (CAFTA-DR), the Phytozoosanitary Law was reviewed and modified. A new regulation regarding intellectual property protection of plant varieties is being developed. Honduras ratified the Cartagena Protocol in September 2008.

The biosecurity regulation assigns SAG's National Service of Plant and Animal Health (SENASA) as the responsible agency for creating the regulatory framework for agricultural biotechnology. A special committee, the National Committee of Biotechnology and Biosecurity composed of technical scientists from ten public and private sector institutions, evaluates the request, makes the scientific analysis, and advises SENASA in the decision making process.

Section II. Plant Biotechnology Trade and Production:

Honduras is the only country in Central America and one of the five countries in Latin America that allows the commercial production of biotech crops. The field tests and the approved products by crop are the following:

Approval Year	Company	Crop	Commercial Name	Event	Type of approval
1997	SYNGENTA	Banana		H53, H20, H51, H17	Field trial
1998	MONSANTO	Corn	YieldGard & Roundup Ready	MON 810 & NK 603	Field trial
2001	MONSANTO	Corn	YieldGard & Roundup Ready	MON 810 & NK 603	Commercial
2003	SYNGENTA	Banana			Field trial
2006	PIONEER	Corn	Herculex I	TC 1507	Field trial
2006	MONSANTO	Corn		MON 88017	Field trial

2008	MONSANTO	Corn	YGVTPro	MON 89034	Field trial
2009	PIONEER	Corn	Herculex I	TC 1507	Commercial

Source: Experience of Honduras in the Development and Implementation Process of Regulations in Agro-biotechnology. Article by Rogelio Trabanino Young and Carlos Almendares Cardenas in Agricultural Biotechnology in Mexico, AgroBIO 2007.

In 2010, there were 15,774 hectares of GM corn in commercial production in Honduras including 5,325 hectares of BT corn for worm leaf control and RR for weed control; 1,775 hectares of RR; 1,835 hectares of Herculex I corn for worm and insect leaf control and 6,839 hectares of Herculex I and RR for worm, insect leaf and weed control. There is also a pending approval for YGVTPro (MON 89034) for root worm control.

The corn is planted in the Departments of Francisco Morazán, Comayagua, Olancho, La Paz, Valle, Yoro and El Paraíso. GM is not authorized to be planted in the Departments of Intibucá, Lempira, and Gracias a Dios, or in the municipality of Pespire, Choluteca, as these communities requested that GM corn not be planted there. Additionally, commercial production of GM corn has been restricted to areas away from native corn stocks due to previous GOH concerns regarding the crossing of native corn varieties with biotech varieties. It should be noted that the areas of the country that do not allow GM corn are known to have high levels of poverty.

The Pan-American Agricultural School, better known as Zamorano University, has been a research center for biotech crops for the last 13 years. Zamorano University produces roughly 100 hectares of parental BT and RR per year. Additionally, Zamorano carries out research contracted by seed companies to monitor the susceptibility of the seed to diseases and to evaluate the effectiveness of the seed to disease control.

Expanded use of biotechnology has the potential to benefit Honduran society. Annually, across the country, there are about 349, 600 hectares planted in corn, with only about 35,000 hectares (15%) planted with hybrids and GM corn. The remaining areas are planted with corn seed varieties donated to farmers by SAG and seeds saved from previous harvests by farmers, often referred to as "criollo" varieties.

Honduras imports corn and soybeans from the United States which include GM grains in support of its poultry, livestock, shrimp, and tilapia industries. Additionally, Honduras has widely accepted U.S. Government food donations of soybean meal and yellow corn for these industries since 1999. Honduran GM corn production is used within the domestic market and is exported as well, with GM seed production being exported to Argentina, Colombia, and the United States.

Section III. Plant Biotechnology Policy:

Honduras currently allows field testing and commercialization of GM crops. The opening of the country to biotechnology began when the Standard Fruit Company submitted a request to evaluate genetically modified banana plants in 1996. As there were no regulations related to biotechnology at the time, the Seeds Certification Department of SAG initiated the "Biosecurity Regulation with Emphasis in Transgenic Plants." The regulation was approved in 1998 through Agreement No.1570-98. The legal base for this regulation is the Phytozoosanitary Law of 1994. As part of CAFTA-DR, the Phytozoosanitary Law was reviewed and modified by Decree No. 344-2005 published in 2006. The regulation also reflects the Convention of Biologic Diversity.

The Biosecurity Regulation makes SENASA responsible for the regulatory framework for agricultural biotechnology, including GM product import requests and field testing and commercialization requests for GM crops. The regulation provides the procedures to evaluate a request and assigns the scientific analysis to the National Committee of Biotechnology and Biosecurity (NCBB). The NCBB was created in 1998 to provide advice to SENASA in the decision-making process. The Committee is composed of technical scientists from the following ten public and private institutions:

- National Service of Plant and Animal Health (SENASA), Ministry of Agriculture and Livestock (SAG)
- Directorate of Science and Agricultural/Livestock Technology (DICTA)/SAG
- Focal Point of the Codex Alimentarius in SAG
- Ministry of Public Health
- Ministry of Renewable Resources and Environment (SERNA)
- Competitiveness and Innovation Directorate of the Ministry of Planning (SEPLAN)
- National University of Honduras (UNAH)
- Honduran Foundation for Agricultural Research (FHIA)
- Pan American School of Agriculture "Zamorano"
- Standard Fruit Company

The requirements to request field testing and commercial liberation of an event are based on the Phytozoosanitary Law and the Biosecurity Regulation with Emphasis in Transgenic Plants. The process is the following: (1) a company submits a request to SENASA; (2) SENASA's Director summons the NCBB to review the request; and (3) each institution in the NCBB carries on its analysis and depending on issues raised during the analysis, they continue to meet until a consensus is reached.

The regulation for biosecurity indicates the NCBB should provide an answer to a request within 90 days. When the NCBB reaches a consensus, it forwards the resolution to the Director of SENASA. The final political decision is made by the Minister of Agriculture and Livestock. Once the Minister approves, the Director of SENASA notifies the resolution and findings of the NCBB to the requesting company.

The estimated time until commercialization varies according to the questions or doubts the NCBB raises. In some cases, the NCBB requests more information from field tests as part of the pre-commercial stage. This stage is usually conducted on one hectare of land. After the test stage is completed, the NCBB can advise SENASA to extend the area from one hectare up to 500-600 hectares, depending on the company's request. The NCBB recommends companies carry out field tests within normal production cycles: the first cycle of harvest begins in May and/or June and the second cycle begins in August and/or September. As an example of the estimated time for commercialization, Monsanto started field tests for BT corn in 1997. After various evaluations and compliance for the requirements requested by the NCBB, various events were approved for commercialization between 2001 and 2003.

Between 2001 and 2003, Monsanto managed the following stages: Field test on one hectare, a second field test from one to 500 hectares, a pre-commercial stage of field test from 500 to 1,500 hectares, and the final commercial stage of more than 3,000 hectares. Pioneer started its field tests for Herculex I in 2005 and the NCBB recommended the pre-commercial liberation in July 2008. The final political decision was given by the Minister of Agriculture and Livestock in November 2008.

The United Nations Environmental Program (UNEP) through the Global Environment Fund (GEF) project provided funds to the Honduran Ministry of Natural Resources and the Environment (SERNA) to develop a specific law on biosafety. SAG worked with SERNA so that the proposed law did not duplicate regulations, which according to SAG's mandate have already been developed. The country requires labeling for the GM seed. It does not require labeling for packaged foods or feeds. There are no technology fees.

The Cartagena Protocol on Biosafety was ratified by the Honduras Congress in September 2008. In reference to intellectual property rights, the Law for the Protection of Variety Plants needs to be approved by the Honduran Congress, which has been pending since 2001. The law protects the developer of new varieties and the variety itself. Honduran officials normally participate in meetings of international standard-setting bodies related to biotechnology.

Section IV. Plant Biotechnology Marketing Issues:

Market acceptance for selling biotechnology products by producers and importers is favorable. Particularly, producers using biotechnology see the benefits of increased yields. However, there are still myths about GM products that need to be overcome within the Honduran market. The chart below shows preliminary data from corn producers that use different agricultural technologies.

Yields in Corn Production

	From **Metric tons per hectare**	**To** **Metric tons Per hectare**
Varieties	2.3	2.7
Hybrids	3.2	3.6
Genetically modified	5.4	8.0

The fruit and vegetable producers that grow crops for export find it very useful to rotate their crops with GM corn. This assures them that the fruit and vegetables exported are free of pesticide residues and pests. Consumer groups, however, are uncertain about the benefits of GM grains because they have been influenced by widespread negative information which is not based on science**.**

Two representatives of the public and private sector of Honduras wrote guidelines that are useful for firms looking at Honduras as an export market for GM crops. Companies requesting a risk evaluation for a test trial or the commercial liberation of a biotechnology product must provide the following information to the Biotechnology and Biosafety Committee:

- *Personnel involved*. Names, addresses, and telephone numbers of the people that have developed or supplied the event.

- *Purpose of the evaluation*. Provide a detailed description of the purpose of the introduction of the event, including the experimental design and/or the proposed production.

- *Description of the genetic material*. Provide a description of the desired or real characteristic of the modified genetic material. Also include how the characteristic differs from the parent non-modified organism (i.e., morphologic or structural characteristics, activities and physiological processes, number of copies of the material inside of the recipient organism (integrated or extracromosomic) products and secretions and characteristics of growth.

- *Transformation methods*. Country and place where the parent plant, the receptor organism and the vector were collected, developed and produced. Transformation methods and selection processes employed.

- *System used to produce the event*. Provide a detailed description of the molecular biology of the system (For example: donor-recipient-vector) that will be used to produce the event.

- *Place of evaluation*. Country and geographic location of the evaluation, specifying the exact description of the areas to be evaluated.

- *Biosecurity measures*. Provide a detailed description of the processes and security measures that have been used or will be used in the country of origin, the countries that will be in transit and in Honduras, to prevent the contamination, liberation and dissemination of the production of the donor organism, the recipient organism and the vector, the constituent of each event and the event.

- *Programmed destination*. Provide a detailed description of the programmed destination (including the final destination and all the intermediary destinations), uses, and/or distribution of the event (Example: greenhouses, laboratories, or place of the growth chamber, site of the field test, site of the pilot project, production, spreading, manufacturing site, proposed site of sale and distribution).

- *Containment measures*. Provide a detailed description of the procedures, processes and security measures proposed that will be used to prevent the escape and spreading of the event in each of the programmed destinations.

- *Method of final disposal*. Provide a detail description of the proposed method for the final refusal of the event.

  Source: Rogelio Trabanino of Zamorano and Carlos Almendares of the Plant Health Division of SENASA.

Section V. Plant Biotechnology Capacity Building and Outreach:

In 2007, the Foreign Agricultural Service (FAS) in Tegucigalpa organized a series of conferences, "Ten Years of Biotechnology." The U.S. speaker made presentations focused on scientific studies done about the use of biotechnology. The audiences included the Minister of Agriculture and SAG officials, the Minister of Natural Resources, officials from other GOH institutions, non-governmental organizations, journalists, and public opinion makers.

FAS has also coordinated with Zamorano University on biotechnology outreach activities. In 2007 Zamorano organized a Biotechnology Conference with the participation of the Minister of Agriculture and Livestock. Through the USDA Cochran Exchange Program, members of the NCBB have participated in biotechnology training.

In 2010, through a regional biotech outreach program, FAS/Tegucigalpa, eight Honduran public and private entities, and the Inter-American Institute for Cooperation in Agriculture (IICA) supported outreach activities consisting of six presentations and various field visits to biotech farms and Zamorano University. Honduras was chosen for this venue because it is the regional leader in biotechnology. The target audiences included the Honduran Biosafety Commission, the Minister of Agriculture and his chief advisors, the Minister of Environment and staff members, Private Volunteer Organizations (PVOs) working in the areas of food security and agricultural development, and faculty and student body representatives of Honduran agricultural universities. A U.S. speaker gave presentations about "Biotechnology and Food Security," and during a field visit to commercial biotech farms, local farmers explained to delegation members from Belize, El Salvador, and Guatemala the benefits they have received from the cultivation of GM corn.

The most important presentation took place on June 29, 2010, for PVOs, the private sector, and the media. More than 400 people attended the presentation including the Belizean, Salvadoran, and Guatemalan delegations. The event was inaugurated by the Honduran Presidential Designate Samuel Reyes who represented Honduran President Lobo, U.S. Ambassador Hugo Llorens, FAS Administrator John Brewer, IICA Director-General Dr. Victor Villalobos, and Honduran Minister of Agriculture and Livestock Jacobo Regalado. Also participating were Honduran farmers who gave brief but powerful testimonials concerning how they had benefited from biotechnology. Media coverage of the public events was extensive.

Overall, the outreach program improved the public perception of biotechnology within key target groups. It also helped elevate further the profile of Honduras as a regional biotech leader and served as an opportunity for the new government to

focus on activities that would help small growers adopt biotechnology. The outreach program demonstrated the institutional support biotechnology already enjoys in Honduras evidenced by the eight Honduran public and private entities that supported the event.

The specific needs, strategies, and new activities of Honduras for agricultural biotechnology identified by scientists and producers using biotechnology are described below:

1. Continued education and training activities for the GOH, the private sector, agricultural technical schools, universities, producers, exporters and the public at large in order to:

   a. Address the food crisis and serve as a development tool by increasing agricultural productivity and food security, reducing crop input costs, and helping to alleviate poverty.

   b. Acknowledge the global scientific consensus on the safety of fourteen years of research on biotechnology products.

   c. Address the environmental gain from decreased pesticide use and reduced soil erosion, while stressing the potential for improved nutrition and disease prevention.

   d. Raise the capacity to abide by global trading rules and apply science-based evaluation of agricultural production methods and regulations.

2. Strengthen the alliance between the private sector and the GOH to:

   a. Preserve native varieties of corn through the establishment of germ plasm banks or the financing of the production of local varieties.

   b. Establishment of pilot projects in key regions of Honduras in which growers could see and compare the various qualities of GM corn (e.g. resistance to pests/disease and increased yield potential/profitability) in comparison to non-GM corn.

   c. Bolster food security by using the positive impact of GM crops on costs-of-production and yields, reduced use of agrochemicals, and research and development that can promote agricultural growth and reduce rural poverty.

   d. Strengthen competiveness and food safety for exporters to comply with CAFTA-DR and other trade agreements by using corn within fruits and vegetable crop rotations.

   e. Enhance the positive benefits of GM crops to human health, e.g., the ability of GM corn to decrease the presence of Fumonisins and Aflatoxins in the Honduran corn crop which causes spina bifida and various types of cancer, respectively.

Section VI. Animal Biotechnology:

In Honduras, there are no agricultural products that have been developed or derived from animal biotechnology. There are no regulations being developed for products derived from modern agricultural technologies.