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# PROEXAG II



EXPORT INDUSTRY TECHNOLOGY SUPPORT PROJECT (AGRICULTURAL COMPONENT)

## STUDY OF THE ADAPTABILITY OF BLACKBERRY IN THE GUATEMALAN HIGHLANDS

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## **PREFACE**

This study resulted from a concern voiced by the ROCAP environmental Officer, Dr. Wayne Williams. In his opinion blackberry is a noxious weed that may easily escape cultivated plots in the Guatemalan highlands and overrun surrounding areas.

Under PROEXAG I and II, the production of blackberries for export as a high-value crop was promoted in Guatemala, although not in the highlands, and the cultivar Brazos was recognized as a superior variety following variety field trials in Guatemala and Costa Rica. This study was commissioned by PROEXAG II (EXITOS) to try to determine the validity of Dr. Williams' concerns that the Brazos cultivar actually poses a threat to the ecology of the Guatemalan highlands.

The author of this study has ample experience in the production and management of blackberries in Guatemala and Central America, and is a producer and exporter of raspberries. He is a graduate of the Panamerican School of Agriculture at Zamorano, Honduras, and has a B.S. in Agricultural Sciences from the University of Florida at Gainesville. As well as being an agriculturist, he has been, and continues to be, very active in environmental affairs and in the conservation of natural resources in Guatemala. He is currently Vice President of the Audubon Society of Guatemala.

## STUDY OF THE ADAPTABILITY OF BLACKBERRY IN THE GUATEMALAN HIGHLANDS

### I. Background of blackberry cultivation (Rubus spp.) in Guatemala.

Several species of wild blackberries exist in Central America and are widely disseminated in all of the Meso-American highlands. Guatemala has some of these species, but which haven't been cultivated on a commercial basis for exportation. There do exist small plantings of these blackberries produced for the local market.

In the early 1960's, blackberry cultivars for commercial production were introduced into Guatemala for the first time for observation of their adaptation and productive potential. The North American cultivar which adapted best was Brazos. This cultivar was introduced into many areas, especially in the highlands, where the vegetative material was widely disseminated among farmers. However, many years passed before anyone paid much attention to this cultivar, or to its productive capacity. Brazos was left abandoned for almost thirty years. There do exist zones, such as Chimaltenango, where blackberry was introduced first as a cultivated crop, but then, through neglect, went on to become an impenetrable natural hedge.

As of approximately five years ago, blackberry production started to become popular among the farmers of the Guatemalan highlands. This because good prices were obtained during the winter months in the United States and Europe for fresh, quality fruit. The blackberry (Brazos) plantings started with small plots of approximately one to two acres each and, in some cases, larger extensions of about seven acres.

Channels of distribution were established, and with them, local agents that managed the fresh fruit giving it over to a broker or to another enterprise abroad. The crop began to make an impact among those non-traditional agricultural products most important in terms of growth, due to its highly labor-intensive nature. In 1991 there was a substantial increase in the number of pounds exported in comparison to that exported in 1986.

Due to abundant supply from Guatemala and South America countries, e.g., Colombia, and a resultant reduction in international prices, the area under production has peaked for some Guatemalan commercial enterprises. In the months of March and April of 1992, the prices for export blackberry were below those of the previous years for the same period of year. The result is a reduced margin of profit for some producers, but not as severe for others who are vertically integrated, i.e., producer-exporters.

The cultivar Brazos was developed by Texas A & M University and is the result of several crosses that gave it better qualities than other blackberry cultivars, i.e., vigorous growth, self supporting vines, high production capability, good adaptation to the sub-tropical climates of the Southern United States and, large and good quality fruit. It was introduced to the public in 1959. From Brazos other improved cultivars were developed for certain climatic conditions: Brison, Rosborough, Womack, Cherokee, Comanche, Cheyenne, and Shawnee.

The first time that Brazos is known to have been introduced into Guatemala was in 1963 by Alberto Bianchi at San Jose Pinula, Department of Guatemala. It was given out by him to several of his farmer friends to be propagated and disseminated in the highlands of Guatemala. The original Brazos plantings were abandoned for almost 30 years and the variety was not reproduced vegetatively to increase commercial plantings during this time. The original planting still exists in San Jose Pinula where it has been maintained but without appropriate care. It was not until a few years ago that the blackberries that had been planted in small plots were reproduced through vegetative propagation in order to begin formal plantings of the same. Most of the producers did not have the slightest idea that the variety they were propagating was Brazos, and in some cases considered it a Guatemalan wild variety with excellent production capability.

PROEXAG had its beginning in 1987 as a project which offered consulting services in commercialization, production and up-to date prices and markets for non-traditional agricultural products for export. Among these products were blackberry and raspberry, both crops with large potentials for growth. The first PROEXAG introductions of different cultivars of blackberries and raspberries began in May - June, 1988. The second was in August, 1989. These cultivars were distributed in the Departments of Guatemala, Chimaltenango, Sacatepéquez and Quetzaltenango on both occasions to farmers who, as collaborators, were responsible for reporting the adaptation trial results. A few farmers knew of the existence of a "wild" blackberry which had very good flavor and good production capability, besides those introduced by PROEXAG. After comparing it to the PROEXAG introductions, the wild variety turned out to be Brazos, which was then also reproduced for commercial plantings.

## **II. Economic Situation**

It is estimated that in Guatemala there are around 255 to 340 acres of planted blackberry. Of this amount, only 50 - 60% are in full production, getting between 882 to 2941 "flats" (cardboard box holding 12 half-pints) of exportable fruit per year per acre. The percentage of rejects is estimated at between 12 - 40%. This depends on the geographical location, climate (wind, rain, frosts) and management. This estimate is an average of data obtained from different producers in the departments of Chimaltenango, Guatemala and Sacatepéquez.

The plantings in Guatemala are managed according to the pattern of renewing canes once they have reached their production peak. The distance between the plants, as well as the cultivation management, i.e., for weeding, pruning, harvesting, and etc., are almost the same for all of the plantings. The average number of full-time employees per acre is about 2 - 4 persons, increasing substantially at the time of harvest. Brazos is generally an easy plant to bring to production, as long as the climatic conditions are adequate. Existing limitations to the cultivation of Brazos include those of climate, i.e., hail, wind and frost, as well as diseases caused by fungi which at certain times limit production.

Exports from Guatemala in 1990, based on data from the Guatemala Ministry of Agriculture, reached 81,210 kilograms. Up to September 1991, the quantity exported increased by 95% to 101,513 kilograms. For 1992 a similar quantity, or more, is expected, since there are several new plantings that are beginning to produce.

Up to 94% of the Guatemalan blackberry production is from the cultivar Brazos. The cultivar Rosborough is at a lower percentage, but there is a producer who prefers it to Brazos for its firmness, fruit quality and more prolific production of canes. In order to determine the size of plantings by percentages, the following numbers were established by size of planting.

<u>Area in Acres</u>	<u>% of Total</u>	<u>Age</u>	<u>Location</u>
17 to 34	69%	3-4 yrs.	Guatemala Sacatepéquez Chimaltenango Sacatepéquez
8 to 16	9%	2-4 yrs.	Guatemala Chimaltenango
2 to 7	22%	2-5 yrs.	Chimaltenango Guatemala Sacatepéquez

The above data are approximations of the areas in production at present. There is an undetermined acreage newly planted and not yet in production.

### III. Interviews With Blackberry Producers in Guatemala

In order to make a better analysis of the opinions of the present producers of blackberry in Guatemala, a series of personal and telephone interviews were held with the majority of the important producers who are exporting and who are obtaining good production results. During some meetings it was not possible to obtain all of the information desired. Because of this there may be some small differences in the estimates of production and areas cultivated. Many of the meetings were held in Xelajú, the indigenous name for the city of Quetzaltenango. In this region located 2,200 meters above sea level, the adaptation trials gave unfavorable results, which results contributed to the initiation of this study.

Other interviews with farmers of the Xelajú region reflect different viewpoints on the cultivation of Brazos. Two of the farmers commented that this variety was a very good producer, but that, unfortunately, the brusque changes of temperature made it impossible to keep the plants alive and in production during the months from December to March. The intense cold kills the producing plants, and in some cases, considerably limits the root and vegetative development of the affected plants. Furthermore, the damage due to the cold makes the plants susceptible to fungal diseases that cause severe limitations in growth. Blackberry is especially susceptible to such disease-causing fungi as Botrytis cinerea, Elsinoe veneta, Leptosphaeria coniothyrium, Sphaerotheca humili,

Alternaria spp., Didymella applanata and Septoria rubi, as well as to nematodes and bacterial diseases, to which Guatemalan farmers are unfamiliar.

None of the farmers of the region mentioned that Brazos had caused them problems by being over-aggressive; on the contrary, because of the frosts, the plant vigor was from normal to low. The climate of Xelajú is the main limiting factor in blackberry production for that region, either for local consumption or for export. Another limiting factor is the long distance to the airport in order to export the fruit.

#### **IV. Tour of Quetzaltenango and Meetings**

In order to determine the status of the blackberry in Xelajú, accompanied by Karl Ufer and Javier Siliezar of EXITOS, I went on two tours during which I interviewed persons who were familiar with Brazos. I noticed that, to the present, no local industry exists for Brazos blackberry production. The reasons for its inadaptability have been described above. This contributes to the fact that Brazos and other similar brambleberry crops are scarce in that region.

Following, I describe Contact Reports with some of the persons I interviewed:

March 24, 1992

8:30 a.m.: Meeting with Julio de la Roca of the Western Affiliate of the Guatemalan Non Traditional Products Exporter's Association (GREXPRONT), in Xelajú. We discussed with Manolo Díaz the possibility of visiting certain persons who have had blackberry plantings since the introductions by PROEXAG.

10:00 a.m.: I contacted Oscar Ovalle who informed me that the original material provided to him by PROEXAG has not developed well due to the severe cold climate in the highlands of Xelajú. The majority of the plants on his farm, San Francisco, have died due to the frosts. Only a few have survived and sprouted anew. Practically, the blackberry plantings have disappeared. Oscar Ovalle's opinion is that these plants will not be a problem in the region as far as aggressiveness is concerned. By aggressiveness we understand the proliferation and production of new sprouts near to the mother plant. The frosts keep the plant growth controlled, killing the sprouts that have grown during the warmer months. The new sprouts that follow are less robust and thus, it is more difficult for the plants to propagate vegetatively. The dead sprouts are also sources of disease-causing microorganisms.

2:20 p.m.: Meeting with Josué Vásquez of the Instituto de Capacitación y Tecnología Agrícola - ICTA - (Institute of Training and Agricultural Technology) in Olinpeque. Josué is in charge of the blackberry trials in the Xelajú region. He has reproduced the material introduced by PROEXAG since 1988 and 1989, and has distributed it to different experimental areas. Karl Ufer, Javier Siliezar and I commented on the purported problem of Brazos' aggressiveness in that region. Josué mentioned that that problem does not exist in the field, because the frosts have counteracted its vigorous growth. This frost damage apparently does not occur near dwellings where Brazos has

been planted in places not affected by frosts, and with very adequate conditions for its constant growth. At ICTA we visited some rows of Brazos blackberries in which the canes were completely destroyed by a frost which occurred March 9th of this year. The plants were just beginning to sprout anew at the time of our visit. They had been planted three years ago and have not multiplied aggressively. We decided to visit Labor San Antonio where other blackberry varieties are planted.

4:00 p.m. Meeting with John Diehl, who is a member of the board of directors of the Western Affiliate of GEXPRONT, and is a vegetable and fruit producer of that region. (See Annex 1)

He said that Brazos is a weed that should not be introduced into nor propagated in Guatemala, and classified the persons who promoted it as irresponsible. He said that its sugar content (brix) is inferior to other blackberry cultivars in Xelajú which can be of considerably superior quality to Brazos. Those recommended by Diehl are Arkansas cultivars. In reality these cultivars have not adapted well to our climates. Diehl furthermore believes that rodents and birds have helped to propagate Brazos, and that it is impossible to eradicate.

March 25, 1992

8:00 a.m. Visit to the Labor San Antonio ICTA farm. Brazos and Brison were planted in August of 1989. The original four rows of Brazos have produced 5,000 sprouts which have been distributed to farmers in San Juan Ostuncalco, San Francisco El Alto and Chimaltenango. Brison has proved to have a brix higher than 11.5, is less aggressive than Brazos and the fruit is smaller. They also have "Mora de Castilla", a wild cultivar, which produces smaller and sweeter fruit than Brazos, but is considerably less productive.

There are other rows planted, supposedly with boysenberry, which has a creeping growth mode and doesn't have thorns. All of the varieties were severely affected by the frosts.

9:00 a.m. Home of Roberto Zarg. He has planted boysenberry as a hedge along the wall, and it is not aggressive. He had Brazos in the garden before, but now he only has a few canes left, some dead due to frosts.

April 21, 1992

10:00 a.m. Interview with Wayne Williams (See Annex 1). Williams is of the opinion that Brazos should not be promoted in Xelajú because this crop tends to develop an extremely vigorous root system due to the accumulation of cold hours and frequent frosts in the region. He believes that the problem with Brazos occurs only at altitudes of 2,200 mts. or higher. He echoes Diehl's belief that Brazos proliferation is carried out through seeds disseminated in the feces of birds and rodents.

## **V. Personal Observations**

Blackberry production in Guatemala and other Central American countries has increased dramatically in the last four years. This production has increased due to the need for other income to replace the diminishing returns from traditional crops. Several plantings of blackberry and raspberry exist which have directly substituted coffee plantings. In order to obtain good production, each acre in production requires constant control, which is reflected in the need for specialized, intensive labor. The initial cost of investment is high and carries with it a constant risk from climatic and economic factors. Nevertheless, today there exists an abundant supply of blackberries in Guatemala.

Brazos and other blackberry cultivars have found great acceptance in the American fresh fruit market. This has benefitted Guatemala's agricultural exporters, and the public in general through the creation of new jobs. This is affirmed by Scott Bradley of Gelco International, the company which imports the majority of Guatemala's blackberries and raspberries into the United States. Gelco manages large blackberry production areas in Texas, mostly of the Brazos cultivar which Gelco considers to be an excellent producer.

In reference to the supposed aggressiveness of Brazos, the plant tends to form a vine which is difficult to control, but only if the plantings are not managed adequately. However, abandoned plants have not expanded more than four meters in diameter in several years. Brazos behaves like any normal crop when it receives the proper attention.

I should clearly emphasize that the opinions received from persons in disagreement with Brazos plantings were only personal opinions. At no time were these opinions able to be proved, and no indications exist that said theories or opinions are true and accepted. For example, there doesn't exist a relationship between the root proliferation due to the accumulation of low temperature days or frosts, or in the case that rodents and birds may cause plant proliferation through dissemination of the seeds in the fields. The literature that was investigated doesn't mention that the seeds are viable at all when transferred from one place to another. Of the plantings visited (about 15), there were no sprouts noted in the range of feeding and defecation for birds and rodents. In plantings that were abandoned, restrictions on growth through fungus diseases and insects that attack the canes have been noticed, thus limiting plant proliferation. In frost affected areas, the new shoots are severely damaged by the frost and the resultant fungal diseases on the weakened canes, causing their death.

The departments of Chimaltenango, Guatemala and Sacatepéquez have been areas of Brazos field trials for many years. If viable seeds had been widely dispersed, Brazos would be found throughout these three departments as well as in those with more favorable climates.

The cultivars recommended as alternatives to Brazos by certain persons interviewed, are northern varieties not completely adaptable to our climate because they require certain amounts of cold hours accumulated during the year, which Guatemala does not have. Brazos, on the other hand, was developed for warmer climates and does not tolerate cold temperatures.

The following are my personal points of view:

1. The Brazos blackberry cultivar is not a harmful weed which represents a danger for the ecosystem and the environment of Guatemala. Brazos was introduced and distributed in the highlands in 1963 and up to now it has not been known to cause problems as a noxious weed.
2. Brazos, and other varieties derived from it, are very susceptible to frosts, which cause the death of the stems in temperatures of zero degrees centigrade. This does not allow the plant to continue growing vigorously during the months from December to March in Guatemala when low temperatures do not permit normal development.
3. It is not known with certainty if birds and rodents do disperse the seeds through their feces. The literature consulted does not mention this as a possibility, nor does it mention it at all.
4. There are about 213 acres of Brazos blackberry in production in Guatemala. It is estimated that there are between 2 to 4 full-time employees per acre. To this number should be added all of the other employees involved in transportation and management of the exportation. In total, there are about 1,800 full-time employees employed in this crop in Guatemala.
5. There is no evidence that any natural forest was destroyed in order to plant blackberries in its place.
6. A high percentage of women work in these plantings, thus increasing family income.
7. At present the income per area in blackberries is greater than that of any other crop in Guatemala.

Crop management is essential, but Brazos does not escape and proliferate in nearby fields. Regions with climatic conditions similar to Xelajú are not adequate for this type of open air planting. If the aggressiveness of Brazos were a fact, in more than 28 years Brazos has had the opportunity of demonstrating its aggressiveness throughout Guatemala, but the evidence says otherwise.

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**ANNEX 1**  
**REPORT OF INTERVIEWS WITH JOHN DIEHL AND WAYNE WILLIAMS**

The reason for the visit with Diehl was to exchange opinions with respect to the possible problem that Brazos behaves as an uncontrollable, harmful weed in the region of Quetzaltenango (Xelajú), as stated by Wayne Williams. I mentioned the purpose of our visit; that we wished to arrive at conclusions from both points of view. Diehl said that the introduction and promotion of the Brazos variety was a grave error on the part of PROEXAG since this plant proliferates uncontrollably, and it is very difficult to eradicate. He commented that for this climate the cultivars that should be used were those from Arkansas, such as Shawnee, Cherokee, or Cheyenne, because these can be established in our climate. He said that in Xelajú there are more than 700 hours of cold weather below 42°F per year. He based his opinions on:

1. The variety Brazos produced in Xelajú has a fruit sugar content (brix) of 8, which is considered sour.
2. It is such an aggressive plant that is almost impossible to eradicate.
3. It is disseminated through seed dispersal by birds and rodents.
4. The people who have introduced Brazos were irresponsible.

In spite of the exchange of views, Mr. Diehl maintains his opinion that only under the supervision of professionals should this plant be cultivated, and under no circumstance should it be given to persons who do not have a knowledge of agriculture.

April 21, 1992

Meetings with Dr. Wayne Williams with respect to the aggressiveness of Brazos.

Dr. Williams sustains his belief that Brazos is a harmful plant that should not be promoted in Guatemala because of the possibility of an uncontrolled dispersal which could cause an environmental problem. His opinions are the following:

1. Do not promote Brazos in areas of altitude higher than 2,200 mts above sea level. As an alternative, other varieties should be found which are better producers, and of better quality than Brazos.
2. Brazos becomes more aggressive at higher altitudes because it accumulates more cold hours. These low temperatures vigorously stimulate its root system.
3. The strong frosts of Xelajú kill the foliage but stimulate an aggressive root growth which allows that the rhizomes spread uncontrollably.