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'Reyna' (syn. 'Alfajayucan') is the Leading Cactus Pear Cultivar in Central México

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Abstract

National cactus pear (*Opuntia amyclaea* Tenore) consumption is dominated by the white fleshed variety 'Reyna' or 'Alfajayucan', which is an alternative crop for regions regularly affected by drought, where chronic losses in traditional crops such as maize, beans, wheat and barley are serious economic hardship to farmers. Its wide range of adaptation, stability, and outstanding fruit quality expressed as size, thin peel, reduced seed number, juiciness and sweetness, has made it the most popular variety among growers and consumers. However, its relatively thin peel demands special management practices after harvest. Even though 'Reyna' is susceptible to *Alternaria* spp ('Fiebre del oro') and to low winter temperatures, it accounts for 36% of the cactus pear production in Mexico (4).

Introduction

Cactus pears are naturally distributed in the semiarid regions of Central and Northern México and they were cultivated well before the discovery of America (1). During the last four decades, cultivation has increased tenfold and is gaining great importance as an alternative crop for the semiarid regions. However, no formal descriptions of cultivated clones have been reported. This work describes the most important cactus pear cultivar to establish a reference for future cultivar descriptions.

Origin and Distribution

'Reyna' was selected by farmers before the 1950's from a wild population because of its yield potential and fruit size, thin peel, reduced number of seeds, juiciness and sweetness. Initially, it was planted in small numbers, but during the last two decades it has acquired commercial importance.

Current distribution of this cultivar includes approximately 15,000 ha (37,500 acres) in five different states in Central México. It is a semiarid region located at the southeast tip of the Sonoran-Chihuahuan desert, at an elevation ranging from 1800 to 2400 and a temperate climate and an annual rainfall from 400 to 700 mm. The region was formerly devoted to basic crops and grazing; but it is marginal because soils are shallow, slightly alkaline to acid, and terrain is sometimes steep.

Description

Plants of 'Reyna' are vigorous, reaching 2.5 m in height and a canopy of 4 to 5 m in diameter. Cladodes are oval, with a green-blue color and have three to four persistent spines at the base of each areole.

Flowers are deep orange and budbreak generally starts in January, extending to mid March, as influenced by weather conditions during winter. If first blossoms are destroyed by frosts, a second flush of floral buds are developed to bear a normal crop (3). However, because 'Reyna' blooms early, it is not cultivated in the northern part of the cactus pear area of distribution.

'Reyna' is an early ripening cultivar with a wide blossom and harvest period (from late June to early September) and a peak in July. Yields are high (10 tons/ha) for a semiarid ecosystem under conventional management practices they can reach up to 40 tons/ha if supplemental irrigation and application of organic matter are supplied (2).

Fruit quality is high in 'Reyna' (Tables 1 and 2), as determined by several

[1]Nopal and [2]Fruit Breeding Program respectively, Campo Experimental del Norte de Guanajuato (CENGUA)-INIFAP, Apartado Postal 25, San José Iturbide, Gto. México, CP 37980.

Table 1. Average quantitative traits of ripe fruit of prickly pear, cv "Reyna" registered in 13 orchards in Central México during 1992.

Variable	Mean values	CV (%)
Weight	141.1	17.5
Size		
width	8.6 cm	8.5
length	5.8 cm	8.1
Edible portion	67.0%	17.7
Total seed weight	5.2 g	16.0
Proportion of aborted seeds	16.0%	35.7
Peel thickness	0.47 cm	5.2
Soluble solids	14.8 °Brix	5.8

traits such as size and its relatively thin peel that is highly appreciated in the national market. However, even though internal fruit quality is not affected, its thin peel allows bruising and represents a problem for handling and packing.

Fruits are oval flat with green yellow peel and a bright green sweet flesh. The edible portion includes the seeds, which in 'Reyna' are fewer and smaller (16% of aborted seeds).

During the 1992 season several traits related with fruit quality were observed in 13 different orchards cultivated with 'Reyna' in two of the main cactus pear producing states in Central Mexico (Tables 1 and 2). Sample size was 40 fruits per orchard. Sites 1-6 are small orchards (less than 3 hectares) in Las Piramides, near Mexico City, at a higher attitude (2200 to 2400 m) and a cool environment (mean annual temperatures between 14 and 18°C). Orchards are generally well fertilized, supplied with manure and yield more than 10 ton/ha. While orchards 7 to 13 are larger (more than 10 has.), located in poorer soils in a warmer region (mean 18 to 20°C) in the northwest (Guanajuato) at a lower attitude (1800 to 2100 m). These orchards have lower yields (3 tons/ha). Sample size was 40 fruits per orchard.

Stability, as determined by the values of coefficients of variability (CV) within and among orchards, was high (low CV) for all traits observed, particularly the flesh to fruit weight ratio and soluble solids (less than 10% CV). This explains why 'Reyna' has become so popular among growers in different production systems.

Table 2. Average values for five fruit quality traits in prickly pear cv. "Reyna" as registered in 13 orchards cultivated in Central México during 1992.

Orchard	Fruit weight g	CV[1] %	Flesh weight g	CV %	Flesh to fruit %	Seed to flesh %	Soluble solids °Brix	CV %
1	160.4	21.0	103.0	27.3	64.4	5.3	15.0	9.3
2	150.1	7.8	96.8	12.7	64.6	5.0	14.8	8.2
3	122.1	11.8	77.2	17.1	63.3	6.9	14.1	9.3
4	133.0	9.2	82.8	11.9	62.4	5.6	15.6	4.6
5	146.0	15.0	92.5	15.0	63.3	5.9	14.3	6.5
6	145.5	4.2	97.9	12.4	67.6	5.9	15.1	5.6
7	147.1	12.3	99.8	18.0	67.3	5.7	14.4	6.5
8	161.7	19.9	109.7	33.4	67.9	4.4	16.2	3.5
9	150.7	15.1	92.2	16.7	62.0	5.3	14.9	1.0
10	122.7	11.4	71.6	12.8	58.4	6.4	14.0	4.5
11	145.5	12.7	94.6	14.4	65.0	5.7	14.9	1.8
12	117.0	23.6	79.3	27.8	67.5	4.7	15.2	4.5
13	132.9	11.0	79.9	12.6	60.1	6.4	14.5	5.0
Mean	141.1		90.5		64.2	5.6	14.8	
CV[2]	10.2		12.6		4.6	12.6	4.2	

1) Coefficient of variability between fruits in an orchard.
2) Coefficient of variability between orchards.

The proportion of aborted (smaller) seeds per fruit is a desirable commercial trait, however, it is strongly influenced by the environment, with a CV of 35%. Other traits with intermediate variability across orchards (CV between 10 and 20%, are fruit weight and total seed weight, which are probably influenced by rain, fruit load per plant and management practices.

Because more than 80% of the national market is dominated by white fleshed fruit and the rest by yellow, orange and red types 'Reyna' will continue to lead in the prickly pear market until new varieties with thicker peel, and higher resistance to frosts and *Alternaria* spp are generated through breeding programs.

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"Tropical Small Fruits": A Workshop Overview with a Summary of Information on Naranjilla and Carambola

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Introductory Remarks

Tropical regions are often areas of tremendous biodiversity, and as such, indigenous species within these regions may include a wealth of fruit crops or potential fruit crops that are relatively under-commercialized. In view of today's "world economy," increased agricultural, exploitation of these species and the expansion of the tropical fruit crop industry seems almost assured due to a myriad of interrelated factors such as: the increase in health-conscious consumer demand for a variety of fruit products; the development of innovative marketing strategies which has fostered greater product recognition by consumers in distant markets; the availability of improved cultivars, cultural practices and postharvest handling/shipping and storage techniques garnered through increased research efforts; and the focus on increased export trade.

Taking advantage of the Honolulu, Hawaii venue and Pan-Pacific theme of the American Society for Horticultural Science's 89th Annual (1992) Meeting as well as the availability of speakers with specific expertise in tropical fruit crops, the Society's Viticulture and Small Fruit Working Group held a workshop exploring the predominant cultivar characteristics, available germplasm, cultural practices and/or production potential of nine undercommercialized tropical fruit crops. Perhaps the "Tropical Small Fruits" workshop would have been more appropriately titled "Tropical Small and Tree Fruit Crops with Potential" as some species discussed produced rather "large" small fruits and because tree fruits were also included.

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