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Production and competitiveness of Mexican floriculture

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ABSTRACT

Objective: To analyze the international commercialization competitiveness of the main flowers grown in Mexico compared to United States of America (USA).

Design/methodology/approach: The cumulative growth rate of the production variables of the main flowers cultivated in Mexico from 2000 to 2020 was calculated. The country's flower trade balance was evaluated. The revealed comparative advantage index (IVCR) of the Mexican floricultural sector was compared with the American IVCR.

Results: Mexican floriculture has expanded in the last two decades; therefore, the 2000-2020 cumulative growth rates of the production variables in most of the flowers studied were positive. It is also a high-income activity. Although only 10.11 thousand ha are used by this sector, the four species of flowers analyzed had a 5.51-billion Mexican pesos production value (2020). Likewise, its trade balance has been in surplus and, in most of the years analyzed, its balance was greater than 90% of the value of exports. In addition, it is competitive in the international market: in 2020, the IVCR of Mexican flowers in the US market was 0.96 and, in the overall period of this study, it has been greater than 0.8.

Study Limitations/Implications: Changes to the Harmonized System Codes hinder the evolutionary analysis of the tariff codes. The IVCR determines if the national market is competitive or not in the international market, but it does not establish which factors would provide competitiveness to the country.

Findings/Conclusions: Floriculture in Mexico has increased in the last two decades. The production value of all the flowers studied increased during the period analyzed. In general terms, the Mexican floricultural market is competitive in the international market; additionally, the different Mexican flowers included in this research have a competitive advantage in the US market.

Keywords: production, trade balance, revealed comparative advantage index, growth rate.

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INTRODUCTION

Floriculture in Mexico is a high-income activity that creates more than 250 thousand direct jobs and almost a million indirect jobs. Women are in charge of 60% of its production (SADER, 2021). This is a very important activity in rural areas of the country. According

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to the production value, the main flowers harvested in the Mexican market in 2020 were chrysanthemums, roses, sword lilies, and carnations with 1.91 billion, 1.79 billion, 1.13 billion, and 661.34 million Mexican pesos, respectively (SIAP, 2021).

In 2020, 3,203.35 ha were used to plant and harvest chrysanthemums, obtaining 12.522 million grosses. The average yield was 3,909.33 gross per ha and the average rural price obtained by the floriculturist was $152.97 per gross. The main chrysanthemum-producing states were the State of Mexico (11.73 million grosses), Puebla (673,000 grosses), and Morelos (100,870 grosses) (SIACON, 2021).

In the same year, roses were planted and harvested in 1,741.90 ha and 1,654.90 ha, respectively, obtaining 9.08 million grosses of this flower. The average yield was 5,488.32 gross per ha and the average rural price obtained by the floriculturist was $197.82 per gross. The main rose-producing states were the State of Mexico (7.08 million grosses), Puebla (655.90 thousand grosses), and Morelos (583.18 thousand grosses) (SIACON, 2021).

Also in 2020, 4,558.32 ha were used to plant and harvest sword lilies, obtaining 5.11 million grosses. The average yield was 1,121.55 gross per ha and the average rural price obtained by the floriculturist was $222.28 per gross. The main sword lily-producing states were Puebla (2.08 million grosses), State of Mexico (1.79 million grosses), and Morelos (595.39 thousand grosses) (SIACON, 2021).

And finally, in the same year, 609.9 ha were used to plant and harvest carnations, obtaining 4.46 million grosses. The average yield was 7,317.28 gross per ha and the average rural price obtained by the floriculturist was $148.19 per gross. The main carnation-producing states were the State of Mexico (4.02 million grosses) and Baja California (439.86 thousand grosses) (SIACON, 2021).

The Mexican flower export amounted to $44.39 million dollars (January-August 2021), a significant increase compared to the total value of 2020, which was $35.96 million dollars (SIAVI, 2021). However, the Consejo Coordinador Empresarial of the State of Mexico reported that, in the same year, sales dropped by 80% in the flower-growing zone of the state, as a consequence of the COVID-19 crisis (El Universal, 2020). The main cause of the impact on the sector was the imbalance of the supply chains, as a result of the quarantine in many regions of the world (WB, 2020). The floriculture importance for Mexico lies in the foreign currency generation and the employment demand in the country's rural areas. Therefore, the trend in the production variables of the main flowers harvested in the Mexican market should be evaluated, in order to determine if the activity is competitive at an international level.

The objective of this research was to compare the international commercialization competitiveness of the main flowers grown in the Mexican market with the USA, which is the main commercial partner of Mexico in floriculture. In addition, the production variables behavior of chrysanthemums, roses, sword lilies, and carnations from 2000 to 2020 was studied, in order to establish these crops' trends.

In 2020, roses accounted for 19.87% of the total value of Mexican flower exports, chrysanthemums, 5.36%, Madonna lilies, 5.01%, carnations, 1.87%, and other fresh flowers, 54.59%. Therefore, the competitiveness of Mexican floriculture in the international market

was evaluated with regard to these groups of flowers, which together accounted for 86.70% of the value of the country's flower exports (SIAVI, 2021).

MATERIALS AND METHODS

Quantitative research, with a longitudinal or evolutionary scope, was carried out (Hernández *et al.*, 2010). We studied the behavior of the production variables for the 2000-2020 period, while the Mexican market competitiveness in the international flower market was analyzed for the 2008-2020 period, taking into consideration the modifications that the flowers tariff codes underwent in July 2007.

The production variables values of the main flowers harvested in the Mexican market (chrysanthemums, roses, sword lilies, and carnations) were obtained from the Sistema de Información Agroalimentaria de Consulta (SIACON). The following variables were analyzed: sown and harvested area (ha), yield (gross per ha), average rural price (pesos per gross), volume (gross), and production value (thousands of pesos). The cumulative growth rate of these variables from 2000 to 2020 was estimated, using the following formula (Pérez *et al.*, 2010, Rivera-López and Gutiérrez-Hernández, 2019):

$$t_{t,0} = \left(\frac{x_t - x_0}{x_0} \right) 100$$

Where: $r_{t,0}$ is the percentage growth rate of each production variable analyzed; x_t is the value of the variable in the year 2020; x_0 is the value of the variable in the year 2000.

The Mexican flower trade balance was estimated based on the statistics of tariff code 0603 "Flowers and buds, cut for bouquets or decorations, fresh, dried, bleached, dyed, impregnated, or otherwise prepared". The data were obtained from the Sistema de Información Arancelaria Vía Internet (SIAVI) and the study period covered from 2008 to 2020. The independent variables in this section were the export and import values, for both of which the American dollar was used as the unit of measure.

For the analysis of the competitiveness of Mexican flowers in the international market, the SIAVI database was consulted. The overall competitive advantage of the Mexican floricultural sector was estimated based on tariff code 0603. Subheading 11 was used to analyze roses, 12 for carnations, 14 for chrysanthemums, 15 for Madonna lilies, and 19 for other types of fresh flowers —including sword lilies, baby's breath, sea lavender, gerbera daisy, English daisy, anthurium, bird of paradise, etc. As a consequence of the modifications made to tariff code 060310 ("Frescos") in July 2007, the analysis period of the Mexican flower competitiveness was carried out from 2008 to 2020.

The revealed comparative advantage index (IVCR) was proposed by Balassa (1965), with the aim of establishing whether or not the specialization of its international trade gives a country any competitive advantage. A given point (year) was taken as reference (Ramírez-Padrón *et al.*, 2018). The IVCR of the different flower types traded in the international market was estimated based on the trade flows of Mexico with its main trading partner

for each flower; the following general formula was used (Durán-Lima and Álvarez, 2008; Rivera *et al.*, 2020):

$$IVCR_i = \frac{X_{ij} - M_{ij}}{\left| X_{iw} + M_{iw} \right|}$$

Where: $IVCR_i$ is the revealed comparative advantage index of each type of flower; X_{ij} is the value of the exports of each type of flower from Mexico to market j; M_{ij} is the value of the imports of each type of flower by the Mexican market from country j; X_{iw} is the value of the total exports of each type of flower from Mexico to the world market (w); M_{iw} is the value of the total imports of each type of flower in the Mexican market from the rest of the world (w).

RESULTS AND DISCUSSION

Mexican floriculture has expanded in recent years, as evidenced by the positive cumulative growth rates achieved by the main flowers produced in the country from 2000 to 2020. The production value of the four studied flowers experienced a considerable increase during the analysis period. The same phenomenon has been recorded for the average rural price of Mexican flowers.

Most of the area used to sow and harvest flowers in Mexico is used for sword lilies; in the study period, these variables increased more than for other flowers (Table 1). The area planted and harvested with roses in the country has experienced a positive trend and increased by more than 450% in the last two decades (Table 1). A worrisome situation is the decrease in the average yield of the chrysanthemum production; during the analyzed period, it contracted by 25% regarding the value of the year 2000 (Table 1). Finally, the production of carnations in the country has a negative trend, although the average rural price of this flower has increased by more than 300% (Table 1).

Mexican floriculture is a high-income activity. In 2020, the four species of flowers analyzed had a production value of $5.51 billion pesos, using only 10.11 thousand ha. Consequently, the average income from floriculture production surpasses $500 thousand pesos per cultivated flower hectare.

Throughout the analysis period, the trade balance of floriculture in Mexico has been in surplus; the Mexican market is a net flower exporter (Figure 1). In 2017, the Mexican flower exports recorded their highest value (more than $40 million dollars). In 2008, the highest flower import value so far was recorded ($3.6 million dollars). Mexico's flower trade balance has been higher than 90% of the exports value in most of the studied years. Consequently, we can reaffirm that the Mexican market is a net flower exporter.

From 2008 to 2020, the US market has been the destination of more than 95% of Mexico's flower exports; therefore, it can be considered the main trading partner. In general terms, Mexican floriculture is competitive in the North American market; in 2020, the IVCR was 0.96 and was higher than 0.8 in the study period (Figure 2).

Table 1. Production variables growth rate of the main flowers cultivated in Mexico.

Flower	Year	Sown area (ha)	Harvested area (ha)	Production (millions gruesas**)	Yield (gruesas/ha)	Average rural price ($/gruesa)	production value (millions $)
Chrysanthemums	2000	1,876.50	1,876.50	10.01	5,335.72	68.07	681.56
	2020	3,203.35	3,203.35	12.52	3,909.33	152.97	1,915.69
	TCA (%)	70.71	70.71	25.07	−26.73	124.72	181.07
Roses	2000	294.00	294.00	1.92	6,531.91	174.25	334.63
	2020	1,741.90	1,654.90	9.08	5,488.32	197.82	1,796.72
	TCA (%)	492.48	462.89	372.96	-15.98	13.53	436.94
Gladiola	2000	754.00	754.00	0.80	1,061.14	95.45	76.37
	2020	4,558.32	4,558.32	5.11	1,121.55	222.28	1,136.36
	TCA (%)	504.55	504.55	538.97	5.69	132.88	1,387.95
Carnations	2000	724.00	724.00	8.68	11,993.14	35.22	305.78
	2020	609.90	609.90	4.46	7,317.28	148.19	661.35
	TCA (%)	−15.76	−15.76	−48.60	−38.99	320.76	116.28

Source: The table was prepared by the authors, based on SIACON statistics (2021).
TCA: cumulative growth rate of each variable from 2000 to 2020.
** gruesa = 144 commercial stems

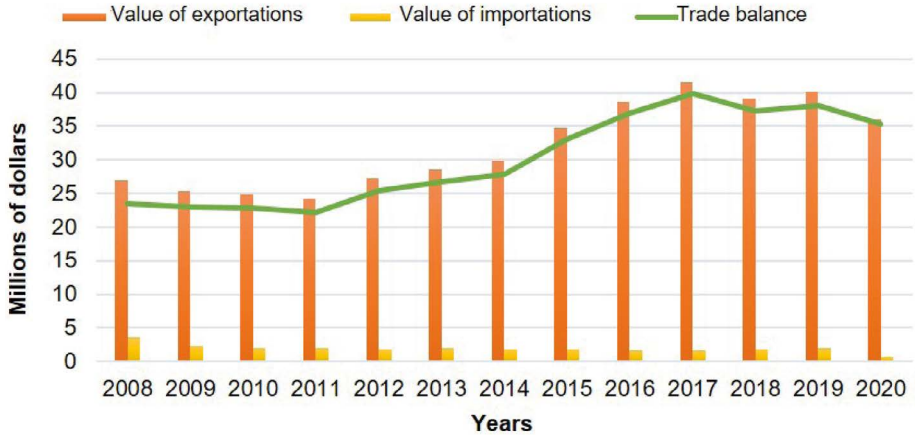
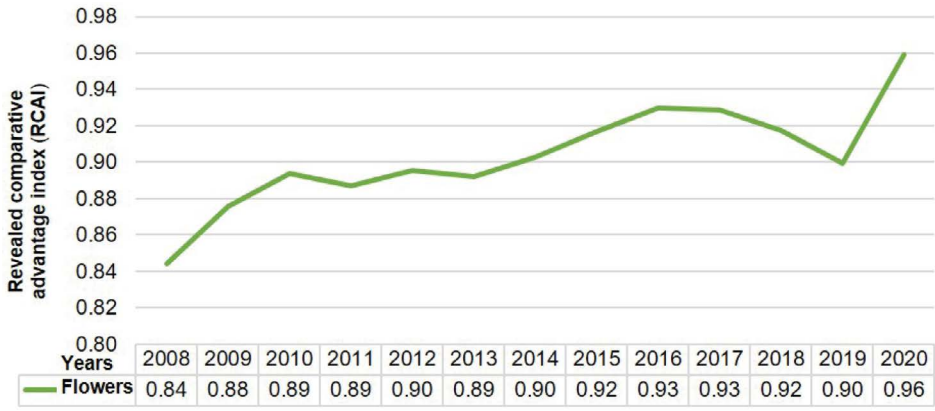


Figure 1. Trade balance of floriculture in Mexico. Figure prepared by the authors, based on SIAVI statistics (2021).

From 2008 to 2020, the value of the IVCR of each type of flower has been close to one in most years (Figure 3). In the case of roses and carnations, the lowest IVCR value in the analysis period was 0.97, showing that these Mexican flowers are competitive in the US market. However, chrysanthemums show how vulnerable the Mexican floricultural export sector is to changes in the North American demand for its products. In 2014, chrysanthemum exports to the US decreased considerably and a 0.29 IVCR was recorded. However, the value of Mexican exports for that year was higher than in 2013, since chrysanthemums were exported to the Canadian market.



Years	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Flowers	0.84	0.88	0.89	0.89	0.90	0.89	0.90	0.92	0.93	0.93	0.92	0.90	0.96

Figure 2. Mexican IVCR regarding the US. Tariff code 0603. The figure was prepared by the authors, based on SIAVI statistics (2021).

Years	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Rose	0.99	0.99	0.99	1.00	1.00	0.97	0.99	0.99	0.99	0.97	0.98	0.98	0.98
Carnation	1.00	1.00	1.00	1.00	0.98	0.99	1.00	1.00	1.00	1.00	1.00	0.97	1.00
Chrysanthemum	1.00	1.00	1.00	1.00	1.00	0.87	0.29	1.00	1.00	1.00	1.00	0.98	1.00
Lily					1.00	1.00	1.00	1.00	1.00	0.97	0.92	0.67	0.99
Rest	0.86	0.89	0.91	0.90	0.90	0.91	0.92	0.92	0.93	0.92	0.92	0.90	0.95

Figure 3. IVCR of Mexican export flowers regarding the US.

The first Madonna lilies were exported to the US market in 2012; since then, this market has consumed almost 100% of the Mexican exports. In 2019, Mexico imported $331,567 dollars of this flower from the US, which diminished the country's competitiveness, consequently reducing the IVCR. Finally, the Mexican market is competitive with respect to the US market, regarding other flower exports: the lowest IVCR value was recorded in 2008 (0.86). Mexican competitiveness has increased since that date.

CONCLUSIONS

In the last two decades, Mexican floriculture has increased, particularly regarding the growth in the production volume of roses and sword lilies. Another relevant variable for flower production in the country is the production value: sword lilies, roses, carnations, and chrysanthemums experienced a considerable increase of this value in the analyzed period. The creation of jobs in this sector is important for the development of the rural areas where Mexican flowers are grown.

Mexico is a net exporter of flowers, and this is reflected in the trade balance of this product group. All the flowers analyzed in this research prove that the Mexican market has comparative advantages regarding the USA. However, the dependence of the national flower sector is worrisome, since any change in the North American demand has a direct impact on exports and indirectly affects the Mexican producer. Mexico needs to diversify its client base, but distances and transportation times limit the export of fresh flowers from the country.

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