Available online at http://www.journalijdr.com

IJDR

ISSN: 2230-9926

International Journal of Development Research
Vol. 09, Issue, 08, pp. 28909-28910, August, 2019

RESEARCH ARTICLE OPEN ACCESS

INFLUENCE OF POLLINATION OF TOMATO PERFORMANCE (*Solanumlycopersicum L.*): A RESEARCH STUDY

***Danilo Sergio Costa, Tiago Perpétuo Ceolin, José Eduardo dos Santos, Luciana Teixeira de Paula, Anisiane Alquaz Alves Gomes Costa, Luiz Miguel Barros and Cynthia Venâncio Ikefuti**

University Center North Paulista (Unorp), Agronomy School - São José do Rio Preto – SP, Brazil

ARTICLE INFO

Article History:

Received 06th May, 2019
Received in revised form
09th June, 2019
Accepted 07th July, 2019
Published online 28th August, 2019

Key Words:

Solanaceae. Bees.
Productive performance.

ABSTRACT

Tomato (*Solanumlycopersicum L.*) is among the most cultivated vegetables in the world, being produced in more than 160 countries. Pollination is a symbiotic process that occurs between pollinating and pollinated species and its importance are to ensure reproduction, fruit development and maintain genetic diversity and a wide variety of food. Fifteen random flowers were selected, which were covered with packages made of "TNT" (non-woven fabric). After the 40-day period, nine pollinated fruits and nine non-pollinated fruits were collected. The tomatoes were then taken to the laboratory for weight, length, and seed count. Pollination was extremely important for the productive performance of S. lycopersicum, since its absence significantly affected the size (6.97 vs 4.47), the weight (114.91 vs 39.93) and the number of tomato seeds (153,77 against 29,22) whose flowers were deprived of this process.

Citation: Danilo Sergio Costa, Tiago Perpétuo Ceolin, José Eduardo dos Santos, Luciana Teixeira de Paula *et al.* 2019. "Influence of pollination of tomato performance (Solanumlycopersicum L.): A research study", *International Journal of Development Research*, 09, (08), 28909-28910.

INTRODUCTION

The tomato (*Solanumlycopersicum L.*) is a fruit with high commercial value and enormous importance in the world [1,2]. In addition to its nutritional importance, tomato is also recognized as a model plant for the study of the development of fleshy fruits (Arah, 2015; Bispo Dos Santos 2009; Cauich, 2004 and FAO, 2018). *S. lycopersicum* originates from the Andean countries and belongs to the Solanaceae family. The annual Brazilian production of tomatoes is estimated at 4.4 million tons, of which 2 million tons of total production, 77% are destined to the market for natural consumption and the rest are raw material for industrialization, with which several products, such as strata, pastes, sauces, juices and other derivatives (FAO, 2018). Brazil is the eighth largest producer in the world, with about 63 thousand hectares cultivated and a production that reaches 3.5 million tons, which means an average of 56 t / ha, that is, twice the average world productivity. The maintomatoproducers are Goiás, Minas Gerais, São Paulo, Bahia and Rio de Janeiro (FAO, 2018 and Hogendoorn, 2006).

****Corresponding author:*** **Danilo Sergio Costa,**
University Center North Paulista (Unorp), Agronomy School - São José do Rio Preto – SP, Brazil

Pollination is one of the key processes in maintaining the diversity, abundance and activities of organisms (Kevan, 2003& 1991 and Klein, 2007), since pollinators are of great importance for the reproduction of most species of flowering plants, and thus for the ecosystem itself , since they support the plant populations that serve as food and shelter for several animals (Sheperd, 2003). Bees, wasps, butterflies, birds and bats are examples of pollinating animals that are responsible for the transfer of pollen between male and female flowers (Kremen, 2005; Kremen, 2004 and Kremen, 2007). Therefore, the present study aimed to verify the influence of pollination on the productive performance of tomato (*Solanumlycopersicum L.*).

MATERIALS AND METHODS

The experiment was conducted at the experimental farm of the University Center of North Paulista (Unorp), located in the district of Talhado, municipality of São José do Rio Preto, state of São Paulo. The evaluations of pollinated and non-pollinated tomatoes were carried out in the laboratories of the University Center of Norte Paulista (UNORP), in June 2018. Tomato seeds were purchased in commercial establishments. The date of sowing was on 08/03/2018 and the transplanting of seedlings was on 04/28/2018. Seven seedlings were planted per row, with 10 rows per block in 4 blocks, totaling 280 seedlings. The experiment was conducted in a completely randomized design. Fifteen random flowers were selected, which were covered with packages made of "TNT" (nonwoven fabric), 4x5cm in white and closed peduncle base with the aid of staples. The peduncles containing the packed flowers were also identified with a red colored ribbon. After 30 days the packages were removed to release the growth of the infructescence and after 10 days of withdrawal, 18 fruits were collected: 9 pollinated fruits and 9 non-pollinated fruits. Being, a pollinated fruit and an unpollinated fruit of the same plant. The tomatoes were then taken to the laboratory for weight (with a scale), length (using a pachymeter) and number of seeds. The analysis of variance (ANOVA) followed by the F test was used to verify the homogeneity of the data and the Tukey test to verify the differences between treatments (with $p < 0.05$ without statistical difference).

RESULTS AND DISCUSSION

At the end of 40 days after flower coverage, a significant difference was observed in all evaluated parameters (Table 1). The significant statistical difference ($p > 0.05$) in the size and weight of pollinated and unpollinated tomatoes may be justified by the amount of pollen transferred. According to Morandin et al. (2001) [13], the size of the tomato, depends on how much pollen is transferred to the stigma. The bigger the fruit, the more weight it has.

Table 1. Productive performance of pollinated and non-pollinated tomatoes (*Solanumlycopersicum L.*)

Treatment	Weight (g)	Length (cm)	Number of seeds
Pollinated	114,91a	6,97 a	153,77 a
Non-pollinated	39,93 b	4,47 b	29,22 b
p-value	>0.05	>0.05	>0.05

Values followed by separate letters in the column differed by Tukey's test ($p < 0.05$ without statistical difference), with CI of 95%.

The tomato is self-fertilized, however, for the flowers to release the pollen, the anthers vibration is (Silva, 2010). In some cases, the wind can vibrate the anthers and promote the deposition of pollen in the stigma of the flower itself, however, if there is no wind, there will be no pollination and thus, the visit of pollinating insects is fundamental (Mcgregor, 1976). In general, Bombus bees are considered the best tomato pollinators; however, other bee species have been shown to be efficient, such as *Meliponaquadrifasciata* (Bispo Dos Santos, 2009). *Nannotrigonaperilampoides* (Cauich, 2004 and Palma, 2008) and *Amegilachlorocyanea* (Hogendoorn, 2006).

Conclusion

Pollination was very important for the productive performance of S. lycopersicum because its absence significantly affected the size, weight, and number of seeds of the tomatoes whose flowers were deprived of this process.

Conflict of interests: There is no conflict of interest between authors.

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