JOJ Horticulture & Arboriculture
ISSN: 2641-8215

Mini Review
Volume 1 Issue 3 - May 2018
DOI: 10.19080/JOJHA.2018.01.555566

JOJ Hortic Arboric

The Tear Pea: A New Vegetable for Innovation in Horticulture

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Submission: April 20, 2018; **Published:** May 16, 2018

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Abstract

The pea crop should be considered from two points of view: dry pea, used in agroindustry and animal feed, due to the high protein content of the dry grain and horticultural pea, used as a vegetable. A special type of horticultural pea is the "tear" pea, considered a mini-vegetable, which is in demand by the high-end catering sector, and for this reason, farmers are interested in its cultivation, due to its high market value. The tear pea is characterized by a very small, embryonic grain, which must be harvested in that immature state to maintain its extraordinary sensory qualities, which provide great commercial value. A breeding program at the MBG-CSIC has resulted in the obtaining of tear pea breeding lines with high quality and gastronomic value.

Keywords: Breeding; Gastronomy; Pisum sativum; Selection; Vegetable

Introduction

The pea (Pisum sativum L) is one of the first crops that have been domesticated, around about 12,000 before present (BP) in the Near East [1,2] and in Central Asia [3], together with other grain legumes and cereals, relevant components of the diet of the initial civilizations in the Middle East and the Mediterranean area. In Europe, it has been cultivated since the Stone and the Bronze Age and in India from the year 2,000 BP [4]. The cultivation of pea has spread from the Near East to Russia, and to the west, through the Danube valley, to ancient Greece and Rome, which facilitated its expansion into Northern and Western Europe. In addition, the pea expanded eastward to Persia, India and China [5,6].

In the MBG-CSIC, the collection and characterization of local varieties of pea has been carried out since 1988 [7]. Currently, in the germplasm collection there are 164 local varieties or landraces (123 from Spain) and a genetic "stock" of breeding lines. In this collection there are materials that have shown aptitude both for the production of dry grain and horticultural pea (especially pod and tear) [8-11].

The pea crop should be considered from two points of view [12]

a) Dry pea: currently used primarily in agroindustry and in animal feed, due to the high protein content of the dry grain.

b) Horticultural pea: often known as garden pea. It can be used in different ways: fresh pod-sweet or sugar pea-similar to snap bean in its use, fresh grain (immature) and "tear" (immature and not developed grain), considered as a mini-vegetable.

The Tear Pea

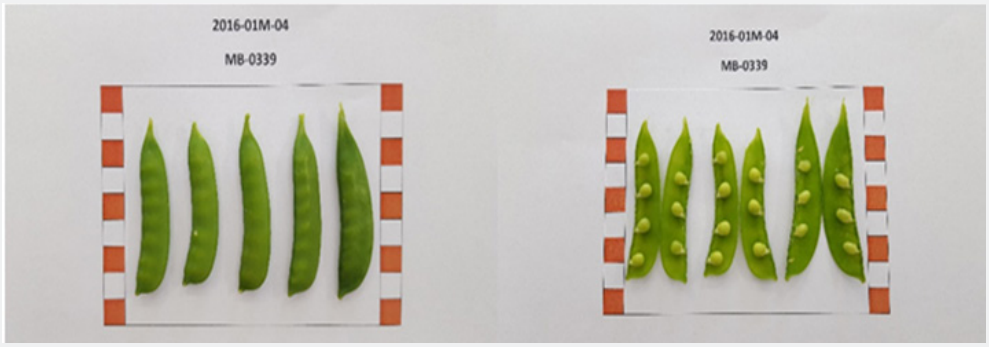

Figure 1: Tear pea breeding line MB-0339. Left: pod; right: open pod with immature embryonic seeds (scale=1 cm).

The name "tear" pea refers to the fact that the immature grain in the embryonic state does not have the spherical usual shape of the horticultural pea, but its shape resembles a "tear" (Figure 1). This type of pea, also known as the "vegetable caviar" (due to its sensory characteristics) and considered a mini-vegetable, is in demand by the high-end catering sector, which is why farmers are interested in its cultivation, due to its high value of market (€150-250€/kg in Spain). To meet this demand, the MBG-CSIC began a program to select and improve tear pea breeding lines. With the information available in the germplasm database as the result of evaluations of plant material from different origins [8-10,13], it was possible to choose varieties that, potentially, met the conditions to be the basis of a selection program oriented to the production of new breeding lines.

The tear pea is characterized by a very small, embryonic grain, which must be harvested in that immature state to maintain its extraordinary sensory qualities, which provide great commercial and gastronomic value, for which the grain of these types must meet certain physical and chemicals characteristics, which have been analyzed in the field and in the laboratories of the MBG-CSIC. From these materials, have been obtained breeding lines that present these physical and chemical characteristics and have been evaluated, in collaboration with farmers and also with restaurants of the area, in order to evaluate their gastronomic value as a basis for their transfer to the horticultural sector.

Conclusion

The process of genetic improvement of the varietal types and breeding lines of pea tear has been based on conventional methods of phenotypic individual selection for obtaining pure lines, based in adapted local varieties or landraces. Currently, the MBG-CSIC has selected lines with good performance, adaptation to a sustainable or ecological production and quality of grain appropriate to the requirements of the high-end restoration. These lines represent a valuable genetic material for the continuation of the improvement program, in order to respond to the requirements of an emerging horticultural sector that currently demands innovative and diversified high quality products.

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DOI: 10.19080/JOJHA.2018.01.555566

How to cite this article: Antonio M De Ron. The Tear Pea: A New Vegetable for Innovation in Horticulture. JOJ Hortic Arboric. 2018; 1(3): 555566 DOI: 10.19080/JOJHA.2018.01.555566