Self-compatibility in some apricot (*Prunus armeniaca* L.) genotypes

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ABSTRACT

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Self-incompatibility is believed to be a common attribute among the most of apricot (*Prunus armeniaca* L.) cultivars. This research was conducted during 2015 and 2016 growing seasons to explore the self-compatibility of 22 apricot genotypes (18 Iranian and four European) based on the field and microscopic examinations. Final fruit set following self-pollination in the field ranged from 1.16% in 'Aybatan' to 62.0% in 'San Castrese' cultivars which showed significant differences among evaluated apricots. The results revealed self-compatibility in the new Iranian promising apricot hybrid, 'AD731', as well as reconfirmed self-compatibility in the European cultivars; 'Canino', 'San Castrese', 'Palumella' and 'Cafona'. In all cases, fluorescence microscopy information supported the self-compatibility results obtained from the field, when at least one pollen tube entered the ovary by 96 hours after the controlled pollination. In addition, all other 17 apricot genotypes showed self-incompatibility feature. The hybrid 'AD731' showed self-compatibility attribute, therefore further research on this genotype will warrant its future use in apricot breeding programs as well as to be considered as promising genotype for being released as a new cultivar.

Key words: Apricot, controlled pollination, fluorescence microscopy, pollen tube growth, Self-incompatibility

INTRODUCTION

Apricot (*Prunus armeniaca* L.) is believed to have originated in China and distributed to Europe through Central Asia and Asia Minor along the Silk Road (Faust *et al.,* 1998; Hu *et al.,* 2018). Since Iran is positioned in the Mid-Asian center of diversification of *Rosaceae* family (Nikzad Gharehaghaji *et al.,* 2014), it is documented as the main source of genetic variability of *Prunus* germplasm comprising landraces, introductions, and wild apricot genotypes originating from natural hybridization and seed-based reproduction (Zhebentyayeva *et al.,* 2012; Zeinalabedini *et al.,* 2014). Iran is one of the centers of origin of apricot (*Prunus armeniaca* L.) and is quite rich in diversity of its germplasm (Arzani *et al.,* 2005; Arzani, 2018). For its great economic significance, detailed analysis has been performed on morphological, pomological and fertilization characteristics of Iranian apricots in recent years (Hajilou *et al.,* 2006). Regarding apricot breeding activities, progenies have been developed and evaluated from controlled crosses between superior local apricot and adapted foreign cultivars (Dejampour *et al.,* 2011). However, detailed field and microscopic studies for assessing the self-(in)compatibility attributes of these genotypes remain to be studied and reported.

Apricot fruit production is affected by

different genetic and environmental factors among which self-incompatibility (SI) and self-compatibility (SC) of flowers are of particular importance (Chen *et al.,* 2006). The SI is a general evolutionary phenomenon in flowering plants to avoid self-fertilization and encourage out-crossing. It is described as the incapability of a fertile hermaphrodite seed plant to generate zygotes following self-pollination (De Nettancourt, 2001). Fruit tree species of *Rosaceae* family represent gametophytic SI, which is managed by a single, polymorphic locus with multiple alleles (S-alleles). The SI alleles pause pollen tube development if the identical allele is existing in both of pollen grain and pistil. The product of S-gene in the style is S-RNase with ribonuclease activity (Vilanova *et al.,* 2006), while in the pollen it is accounted F-box protein (Entani *et al.,* 2003; Milatovic *et al.,* 2013a). The inability of pollen tube growth through the style is related to the interaction of these products.

Evaluation of new Iranian apricot genotypes which are expected to be self-incompatible against European apricot cultivars that are known as self-compatible (Egea *et al.,* 1991; Halasz *et al.,* 2010) has been investigated in this study. Understanding of SI/SC attribute in new apricot cultivars is critical both for breeders and producers. In apricot breeding programs, choice of the suitable cultivars as parents in controlled crossing is of very high importance. Also, the knowledge of self- or cross-compatibility as well as using suitable pollinizers in the commercial fruit orchards such as apricot is an important task for the orchard growers to harvest optimum fruit yield (Andres and Duran, 1998; Arzani, 2018).

Assessment of SI in apricot is traditionally specified by monitoring the percentage of fruit set after controlled self-pollination under the field conditions (Arzani and Khalighi, 1998; Ortega and Dicenta, 2006). Since the fruit set varies in different years due to tree physiology and weather conditions, the repetition of the experiment is recommended for at least two successive years (Milatovic *et al.*, 2013a). The complementary study to the field evaluation, fluorescent microscopy of pollen tube growth in the style is conducted to identify the self-compatibility trait of genotypes (Ortega and Dicenta, 2006; Fotiric-Aksic *et al.*, 2014). This permits more reliable comaprsion with the study of final fruit set percentage under the field conditions (Viti *et al.,* 1997) and is an inexpensive technique in comparison with molecular methods that are recently used for this purpose (Milatovic *et al.,* 2013b). The self-(in)compatibility has been studied in almond (Ortega *et al.,* 2002; Alonoso & Socias I Company, 2005), plum (Nikolic and Milatovic, 2010), and apricot (Milatovic and Nikolic, 2007).

The objective of this research was to evaluate the new apricot genotypes for self-(in)compatibility by studying the rate of fruit set following controlled self-pollination under the field conditions. This was followed by monitoring of pollen tube growth in the style using fluorescence microscopy.

MATERIALS AND METHODS

Plant materials and experimental site: twenty-two apricots (*Prunus armeniaca* L.) genotypes (18 Iranian and 4 European) were evaluated during 2015 and 2016 growing seasons. Eight-year-old apricot trees on the apricot seedling rootstock that were grown in the 4×5 m spacing were selected at the Sahand Horticultural Research Station, Agricultural and Natural Resources Research and Educational Center of East Azerbaijan, Iran.

Pollen germination test: shoots with flower buds were collected at the balloon stage, placed in water and kept at room temperature. Anthers were sampled before flower opening, dried at 20°C until dehiscence and pollen grains collected (Egea and Burgos, 1996). Pollens were incubated in a growth chamber (22 ± 2°C)

for 24 hours on germination medium (1% agar, 15% sucrose and 100 mg-L^{-1} boric acid). Four microscopic areas were observed randomly with three replications per genotype using a light microscope as described by Burgos *et al*. (2004).

Self- and open-pollination in the field: branches with mature buds at the balloon stage were isolated, with cotton tissue bags, and opened flowers removed. About 300 flowers per genotype were hand-pollinated

in full bloom stage. This was done with pre-season collected self-pollens using a small brush according to the method described by Hajilou *et al.* (2006). Pollinated flowers were counted and isolated again until petal fall. Initial fruit set (IFS) and final fruit set (FFS) were evaluated on 14 and 56 days after full bloom (DAFB) stage, respectively. Rate of fruit set was calculated following Jacquemart (2007):

$$\text{Fruit set (\%)} = (\text{Number of fruits} \times 100) / \text{Number of flowers}$$

Furthermore, open-pollination of each genotype was tested in the field to compare with their self-pollination rate.

Self-pollination in the laboratory and microscopy of styles: shoots with flower buds were collected at the balloon stage and kept at sucrose solution 5% (w : v) in room temperature until flower opening. When stigmas were receptive, flowers were self-pollinated by hand. Fixation of pistils was done in a 5 : 5 : 90 (v : v : v) mix of formaldehyde, glacial acetic acid and 70% (v : v) ethanol 96 hours after pollination (Milatovic and Nikolic, 2007). Pistils were immersed overnight in NaOH 4M to soften the tissue. Staining was accomplished with aniline blue 0.1% (w : v) dissolved in KH_2PO_4 0.1M for 48 hours (Milatovic *et al.,* 2013b). At least seven pistils were examined for each genotype using a fluorescence microscope (Olympus- CX31, GD-100; Japan). The number of pollen grains on the stigma and pollen tubes at different style positions (upper quarter, mid-style, three-quarter position, basal of style and inside the ovary) was counted (Hartman *et al.,* 2014).

Statistical Analysis: field data of self- and open-pollination of trees were analyzed as factorial analysis of variance (ANOVA) based on randomized complete block design using SPSS ver. 20 software. Mean comparison performed using Duncan's multiple range test at $P \leq 0.01$. For the lab work, the number of pollen tubes reached

the ovule were recorded, and standard errors were calculated.

RESULTS

In vitro pollen germination test: the majority of apricot genotypes were originated from Iran of which nine genotypes with unknown pedigree (Table 1). Results showed significant differences of *in vitro* pollen germination that ranged from 59% to 84% among apricot genotypes. As it is presented in Table 2, 'AD503', 'ASG', 'AD731' and 'Palumella' genotypes showed high, but 'AD1042', 'KOSH269', 'NM177', 'Aybatan' and 'Canino' displayed low pollen germination rate. The results of pollen germination rate were acceptable for all genotypes.

The field pollination test**:** initial and final fruit set after self- and open-pollination showed significant differences among apricot genotypes during two growing seasons (Table 3). IFS varied from 15.47% in 'DM101' to 80.33% in 'Palumella' genotypes whereas FFS ranged from 1.16% in 'Aybatan' to 62.0% in 'San Castrese' after self-pollination. Furthermore, IFS varied from 16.10% in 'Aybatan' to 71.67% in 'Cafona' genotypes while FFS ranged from 7.93% in 'HS222' to 59.33% in 'Cafona' after open-pollination.

Following of pollen tube growth through the style: pollen tube growth was followed

Table 1. The name, pedigree, origin and the end-use of apricot genotypes

No.	Genotype	Pedigree	Origin	Property
1	AD1042	AC404 × Maragheii90	Iran	Dried
2	AD503	Aybatan × Nasiri90	Iran	Dried
3	HS731	GER × Nasiri90	Iran	Fresh
4	AD626	GER × Ordoubad90	Iran	Dried
5	KOSH269	Unknown	Iran	Fresh
6	ASG	Unknown	Iran	Dried
7	Aybatan	Unknown	Iran	Fresh
8	Ordoubad90	Unknown	Iran	Dried
9	NM177	Unknown	Iran	Fresh
10	GER	Unknown	Iran	Fresh
11	HB190	Unknown	Iran	Dried
12	Canino	Unknown	Italy	Dried
13	SS	Unknown	Iran	Fresh
14	San Castrese	Unknown	Italy	Fresh
15	AD731	Canino × Aybatan	Iran	Fresh
16	HS203	Maragheii90 × Nasiri90	Iran	Dried
17	Palumella	Unknown	Italy	Fresh
18	Cafona	Unknown	Italy	Dried
19	AD509	Maragheii90 × Nasiri90	Iran	Dried
20	DM101	Unknown	Iran	Fresh
21	HS222	GER × Ordoubad90	Iran	Fresh
22	AD740	Maragheii90 × Canino	Iran	Fresh

Table 2. In vitro pollen germination percentage of apricot genotypes using the means of data in 2015-2016 growing seasons

No.	Genotype	Pollen Germination (%)
1	AD1042	*63.00±3.46 h-j
2	AD503	83.66±3.52 ab
3	HS731	77.00±2.64 cd
4	AD626	78.33±1.76 cd
5	KOSH269	63.33±2.72 h-j
6	ASG	82.00±2.88 a-c
7	Aybatan	61.33±2.33 ij
8	Ordoubad90	68.00±3.21 g-i
9	NM177	59.00±2.31 j
10	GER	72.66±2.60 d-f
11	HB190	64.66±1.45 g-i
12	Canino	62.00±2.30 h-j
13	SS	68.33±2.33 f-i
14	San Castrese	80.33±2.33 b-d
15	AD731	84.33±1.76 a
16	HS203	77.66±2.02 b-d
17	Palumella	80.00±3.21 a-c
18	Cafona	70.00±2.64 f-h
19	AD509	71.00±2.08 f-h
20	DM101	71.33±2.33 e-g
21	HS222	74.66±2.33 c-e
22	AD740	78.66±2.33 b-d

Means followed by at least one letter in common are
not significantly different at 1% probabaility level-
using Duncan's Multiple Range Test .

from its germination on the stigma surface through the stylar column to the ovary base (Table 4 and Fig. 1). Number of pollen tubes in the first quarter of the style varied from 26 in 'DM101' to 48 in 'HS731' and 'AD503', in the middle of the style from 13 in 'DM101' and 'HB190' to 25 in 'Cafona', in the basal point of the style from 0 in a few genotypes to 14 in 'Palumella', and finally in the ovary from 0 in the majority of genotypes to 10 in 'Palumella'. The number of pollen tubes declined remarkably from stigma toward ovary in all genotypes.

DISCUSSION

Pollen germination rate of 59-84% indicated that there were high pollen viability and no male sterility among apricot genotypes. The variability of pollen germination rate is considered normal among fruit trees and is depended on both genotype and environmental conditions.

Table 3. Initial fruit set (14 days after full blooming, IFS) and final fruit set (56 days after full blooming, FFS) of apricot genotypes following self- and open-pollinations in 2015 and 2016 growing seasons

No.	Genotype	2015				2016				Description*
		Self-pollination		Open-pollination		Self-pollination		Open-pollination		
		IFS (%)	FFS (%)	IFS (%)	FFS (%)	IFS (%)	FFS (%)	IFS (%)	FFS (%)	
1	AD 1042	44.67±3.38d-f	6.20±0.75ef	54.67±4.18a-f	24.33±2.14d-g	17.50±1.92cd	3.13±1.08e	34.73±3.99bc	14.00±1.90d-g	SI
2	AD 503	44.67±2.02d-f	4.90±0.58ef	62.67±5.44a-d	31.00±1.79c-e	21.93±1.56cd	2.33±0.41e	25.90±1.93c-e	16.73±0.81c-f	SI
3	HS 731	38.67 ±2.18d-h	5.16±0.71ef	49.33±8.76c-f	26.67±4.09c-f	21.97±0.93cd	4.70±0.26e	28.87±2.53cd	14.03±0.16d-g	SI
4	AD 626	39.67±3.33d-h	5.53±0.29ef	62.33±0.98a-d	36.67±3.33bc	18.93±0.75cd	3.60±0.35e	27.33±0.49c-e	17.40±0.76c-f	SI
5	KOSH 269	44.33±1.20d-f	2.63±0.28f	44.67±2.22ef	12.67±1.54gh	23.47±2.41cd	1.50±0.40e	26.13±1.63c-e	11.70±1.30e-g	SI
6	ASG	27.00±1.00i	2.46±0.60f	57.67±0.66a-e	27.33±0.88c-f	18.00±1.50cd	1.23±0.06e	26.40±2.87c-e	13.57±1.81d-g	SI
7	Aybatan	39.00±1.15d-h	2.83±0.76f	55.67±1.65a-f	24.00±1.17d-g	28.20±4.61c	1.16±0.03e	16.10±1.42e	11.40±1.30e-g	SI
8	Ordoubad 90	29.67±2.84hi	2.43±0.75f	41.00±0.59ef	23.67±0.74d-g	18.03±1.21cd	1.56±0.41e	18.47±1.64de	10.83±1.21fg	SI
9	NM 177	36.67±2.33e-i	3.86±0.56ef	58.00±6.93a-e	19.67±0.08e-h	22.10±1.30cd	2.20±0.40e	29.80±1.10cd	13.47±0.61d-g	SI
10	GER	46.67±1.45de	3.76±0.82ef	51.33±4.38b-f	25.33±2.83c-f	17.03±2.21cd	1.76±0.37e	29.90±3.85cd	12.10±0.70e-g	SI
11	HB 190	48.67±4.63d	2.60±0.69f	71.00±4.32a	20.67±1.21e-h	20.67±2.95cd	1.70±0.35e	27.40±2.21c-e	13.70±0.26d-g	SI
12	Canino	69.00±0.57bc	47.33±1.45c	71.33±0.33a	55.33±0.29a	41.67±1.85b	21.10±1.05c	46.00±2.30ab	26.13±2.54a	SC
13	SS	45.33±1.20d-f	8.16±1.07e	45.67±1.41d-f	23.00±1.52d-g	18.90±3.31cd	4.66±0.64e	27.43±3.52c-e	12.67±1.99e-g	SI
14	San Castrese	75.67±6.33ab	62.00±2.11a	67.67±1.16ab	54.67±0.88a	52.50±6.27a	24.90±1.35b	43.97±5.73ab	24.30±2.87ab	SC
15	AD 731	59.33±1.33c	35.00±1.57d	56.33±7.53a-e	43.33±4.37b	24.17±2.73cd	16.37±0.97d	26.70±1.30c-e	17.87±2.25c-e	SC
16	HS 203	33.67±0.88f-i	4.66±1.27ef	56.00±2.54a-f	21.33±5.80d-h	22.00±3.23cd	2.26±0.43e	21.77±0.87de	11.80±0.40e-g	SI
17	Palumella	80.33±2.02a	57.33±1.37b	71.33±2.07a	57.33±4.19a	47.87±1.77ab	28.43±1.57a	48.73±0.89a	22.23±1.43a-c	SC
18	Cafona	72.33±2.84ab	54.33±2.42b	71.67±1.28a	59.33±3.16a	53.70±4.78a	21.70±2.34c	42.40±3.36ab	19.77±1.61b-d	SC
19	AD 509	31.33±3.17g-i	3.03±0.75f	66.67±3.42a-c	29.00±4.75c-e	21.03±1.09cd	1.56±0.08e	22.77±0.72c-e	13.07±1.23e-g	SI
20	DM 101	41.67±3.17d-g	2.80±0.45f	57.33±4.84a-e	16.00±2.22f-h	15.47±1.61d	1.53±0.08e	27.83±3.31c-e	9.16±1.37g	SI
21	HS 222	40.67±1.45d-h	5.23±0.33ef	38.67±2.27f	10.67±1.37h	22.10±1.30cd	3.93±0.63e	19.70±1.10de	7.93±0.72g	SI
22	AD 740	39.33±1.85d-h	4.90±0.55ef	52.00±2.66b-f	33.00±2.06b-d	22.27±0.86cd	2.20±0.47e	44.40±5.31ab	17.33±1.50c-f	SI

Means, in each column, followed by at least one letter in common are not significantly different at 1% probabaility level-using Duncan's Multiple Range Test.
* SI (Self-incompatible); SC (Self-compatible)

Table 4: Microscopic count of pollen tubes in the style of apricot genotypes following self-pollination using the means of data in 2015-2016 growing seasons

No.	Genotype	Pistil No.	Pollen on Stigma No.	Germinated Pollen No.	Pollen tube in of style No.	Pollen tube in 1/2 of style No.	Pollen tube in 3/4 of style No.	Pollen tube in base of style No.	Pollen tube in ovary No.	Description*
1	AD1042	7	38	34	31	17	3	0	0	SI
2	AD503	7	54	50	48	22	5	0	0	SI
3	HS731	7	56	51	48	21	6	0	0	SI
4	AD626	7	49	45	43	22	4	0	0	SI
5	KOSH269	7	41	38	36	17	3	0	0	SI
6	ASG	7	45	41	39	20	5	1	0	SI
7	Aybatan	7	52	48	46	24	6	1	0	SI
8	Ordoubad90	7	54	49	46	22	3	0	0	SI
9	NM 177	7	48	44	43	21	2	0	0	SI
10	GER	7	54	50	48	24	4	0	0	SI
11	HB190	7	39	35	33	13	1	0	0	SI
12	Canino	7	40	36	32	15	9	6	5	SC [y]
13	SS	7	40	36	32	14	3	0	0	SI
14	San Castrese	7	41	37	34	19	12	10	7	SC
15	AD731	7	39	35	32	19	12	9	6	SC
16	HS203	7	39	36	34	16	4	1	0	SI
17	Palumella	7	44	41	38	20	16	14	10	SC
18	Cafona	7	38	35	32	25	17	12	9	SC
19	AD509	7	35	31	28	14	6	0	0	SI
20	DM101	7	32	28	26	13	5	2	0	SI
21	HS222	7	40	36	33	15	6	0	0	SI
22	AD740	7	35	31	29	14	5	1	0	SI

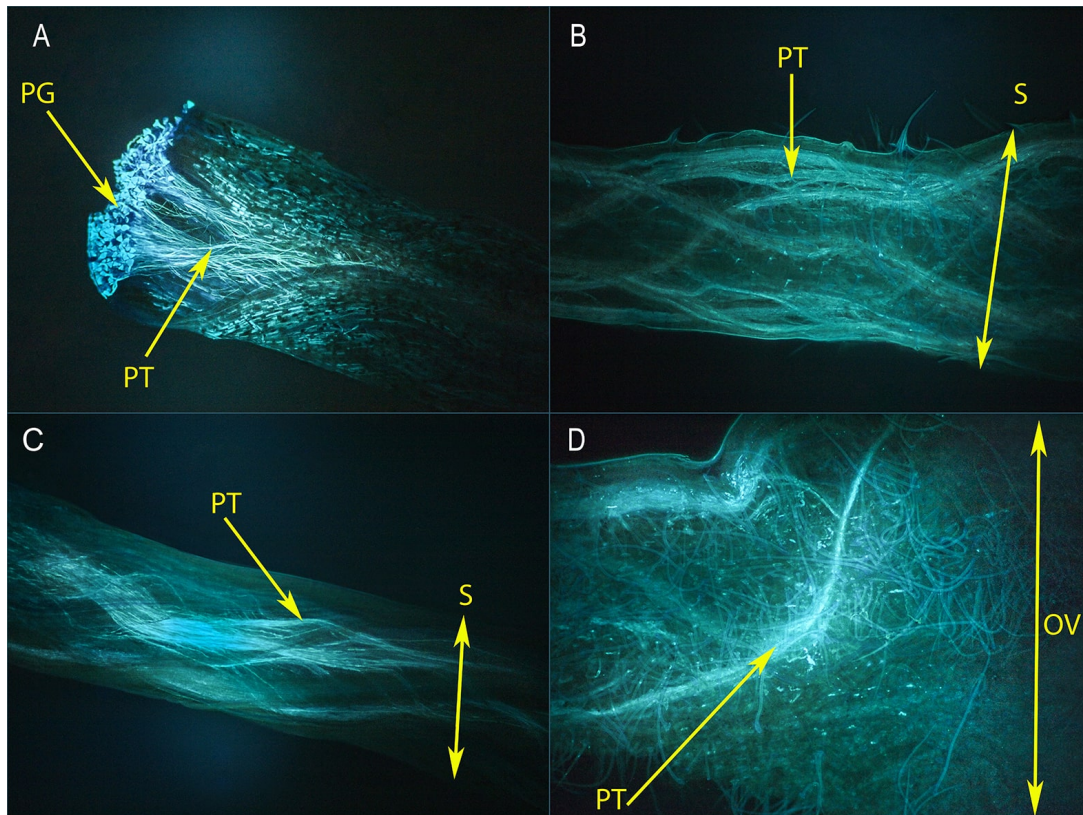* SI (Self-incompatible); SC (Self-compatible)

Fig. 1. Fluorescence microscopy of germinated pollen grains on flower stigma and pollen tubes growth in upper first quarter of the style (A), middle of style (B), basal point of style (C), and inside the ovary (D). Pollen grains are shown with PG, pollen tubes with PT, style with S and ovary with OV.

Most of apricot cultivars produce great amounts of pollen grain with good viability with growing pollen tubes in a wide range of temperatures (Egea and Burgos, 1992).

Fruit abscission at initial stages of fruit development is the main problem in apricot production. A considerable number of cultivars have difficulties in fertilization and fruit development because of SI during fertilization and embryo formation (Burgos *et al.,* 2004; Zhebentyayeva *et al.,* 2012). There are contradictory views among researchers on estimation methods and stages of fruit development at which the character should be evaluated. However, final fruit set (56 DAFB) following self-pollination is considered as a useful index of SI for apricot cultivars in most studies in the last two decades (Arzani and Goharkhay, 2005; Wang *et al.,* 2013).

Apricot cultivars are divided into two main groups: self-compatible (≥ 5 %) and self-incompatible (≤ 5 %) based on the percentage of final fruit set following self-pollination in the field (Zhang *et al.,* 2008; Wu *et al.,* 2011; Wang *et al.,* 2013). Following this standard criteria, apricot genotypes including; 'Canino', 'San Castrese', 'Palumella', 'Cafona', and 'AD731' were considered self-compatible, while other evaluated apricot genotypes were self-incompatible. The FFS rate for 'AD1042', 'HS731', 'AD626', 'SS' and 'HS222' was $\geq 5\%$ in only one year, hence they were considered self-incompatible because microscopic observations could not support their SC trait.

Although in this study the emphasis was on FFS, results of IFS have also been presented. The IFS in self-pollinated flowers of all genotypes was considerable, however, high and significant fruitlet

abscission caused a rapid decline of the FFS. First and second fruitlet abscission is often the heaviest abscission in fruit trees, while tiny and aborted fruitlets drop after incomplete fertilization (Zhang *et al.,* 2008; Wu *et al.,* 2011). This abscission happens because of heavy competition among developing fruitlets for water and assimilates (Dicenta *et al*., 2002; Ledbetter, 2008). Additionally, results of initial and final fruit set after open-pollination is presented to show the potential of fertilization of apricot genotypes under natural conditions. There were no substantial differences in FFS between self-pollinated and open-pollinated flowers in self-compatible genotypes. This finding was likely due to their SC trait, because fertilization in self-compatible genotypes was less affected by the field conditions (Hajilou *et al.,* 2006). Results of FFS after open-pollination of apricot genotypes was different in two growing seasons due to changes in temperature, rainfall, wind, and pollinator insects' activity.

Milatovic *et al*. (2010) and Dordevic *et al.* (2010, 2014) reported that in self-compatible apricots at least one pollen tube was observed within the ovary; but in self-incompatible genotypes, pollen tube development was interrupted through the style and was complemented with the feature of swelling at the apex of pollen tubes. In accordance with this, 'Canino', 'San Castrese', 'Palumella', 'Cafona' and 'AD731' genotypes were categorized as self-compatible. In other apricot genotypes, pollen tube growth terminated at three-quarter of the style length without any pollen tube inside the ovary, thus these genotypes were considered as self-incompatible. The staining techniques of pollen tubes inside the style were described previously by Burgos *et al.* (1997). The internal layer of pollen tube cell walls of fruit trees contains callose or (1.3)-β-glucan (Newbigin *et al.,* 1993) and if is stained with aniline blue, fluoresces intensely when illuminated with blue or ultraviolet light

(Colic *et al.,* 2010).

Self-incomatability was studied by monitoring the rate of final fruit set following controlled self-pollination under field conditions (Burgos *et al.,* 1998; Radicevic *et al*., 2013). Alternatively, microscopic studies of pollen tube growth through the style is also known as a reliable method to determine self-(in)compatibility after hand-pollination in the laboratory. This technique gives more accurate and consistent results, therefore is generally used to confirm the field assessment (Arzani and Khalighi, 1998; Ortega and Dicenta, 2006). The results of microscopic observations in this study supported the results of FFS following self-pollination in the field. Furthermore, we obtained the high FFS after self-pollination among apricot genotypes with more penetrated pollen tubes in the flowers' ovary. Based on these results, Iranian promising hybrid 'AD731' and some European cultivars including; 'Canino', 'San Castrese', 'Palumella' and 'Cafona' were identified self-compatible. The other 17 aqppricot genotypes were determined as self-incompatible. High frequency of SI among Iranian local apricots supports previous studies of SI in Irano-Caucasian apricot group (Hajilou *et al.,* 2006; Halasz *et al.,* 2007).

The self-incompatibility attribute is one of the most important problems in fruit production as it prohibits establishment of single-cultivar prchards and requires planting of two or three cross-compatible and bloom-synchronous cultivars for harvesting high fruit yield (Arzani and Goharkhay, 2005). The flowering of apricot trees occurs in early spring and repeatedly commences in unfavorable weather conditions; for example, low temperature, wind and rainfall that limits bees fly and cross-pollination as well. Hence, planting of adequate pollinizer trees in the orchard should be considered to maintain the economic productivity of self-incompatible cultivars (Zhang *et al.,* 2008; Halasz *et al.,* 2010). Researchers consider the SC

attribute as an important objective in the apricot breeding programs, because it will guarantee effective pollination, and thereby, greater stable fruit yield and yield stability.

CONCLUSIONS

Results of the rate of final fruit set followed self-pollination in the field confirmed the self-compatibility of the Iranian promising hybrid, 'AD731' and reconfirmed self-compatibility in the European cultivars; 'Canino', 'San Castrese', 'Palumella' and 'Cafona'. All other 17 evaluated apricot genotypes showed self-incompatibility feature. The results of the field data were supported by fluorescence microscopy of pollen tube growth through the style in the laboratory. The hybrid 'AD731' showed self-compatibility attribute, therefore further research on this genotype will warrant its future use in apricot breeding programs as well as to be considered as promising genotype for being released as a new cultivar.

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