There are several wild almond species in Turkey included *Amygdalus orientalis* (Mill.), *Amygdalus turcomanica* (Lincz.), *Amygdalus fenzliana* (Fritsch) Lipsky, *Amygdalus trichamygdalus* (Hand.-Mazz.) Woronow, *Amygdalus arabica* (Olivier), and *Amygdalus webbii* (Spach). These species offer a great value for the almond improvement; we studied the pollen viability, germination ratio and pollen yield for seven genotypes of *A. orientalis*, seven genotypes of *A. turcomanica* all growing under natural conditions in Southeastern Anatolia (Gaziantep and Şanlıurfa provinces, Turkey). Almond cultivars (*Prunus dulcis* [Mill.] D.A. Webb) obtained from Pozanti Agricultural Experimental Station, Çukurova University, were also used in the experiment. The pollen viabilities of various almond genotypes were determined by 2,3,5-triphenyltetrazolium chloride (TTC) and fluorescein diacetate (FDA) tests. At the end, pollen germination ratios were established according to Petri dishes method *in vitro* conditions (1% agar + 0, 10, 15 and 20% sucrose) while pollen yield was estimated with hemacytometric methods. The results indicated that pollen viability ratios were close to each other in both methods for the genotypes *A. orientalis* and *A. turcomanica*. Pollen germination ratios were found to be dependent on the sucrose content as well as on the genotypes used. The pollen of almond cultivars showed similar germination ratios in all of the sucrose concentrations while those pollens of *A. orientalis* and *A. turcomanica* genotypes displayed higher germination ratios in 10% sucrose. The number of anthers in one flower was higher in cultivars whereas the number of pollen grains was lower in other almond species. While the number of pollen grains in one flower was relatively high in *A. orientalis* genotypes, pollen quality was high in all the three species under research. The results suggested that these two species, namely *A. orientalis* and *A. turcomanica* could be employed for future almond breeding programs.

**Key words:** *Amygdalus orientalis*, *Amygdalus turcomanica*, *Prunus dulcis*, pollen, germination.

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Indeed, Atlı (2008) reported that and might have a potential for a dwarfing rootstock. Averages suggest that this is a relatively short species. Anatolia Region (Bayazit and Küden, 2007). These had an average plant height of 151 cm while they had an average of 238 cm plant height under and Southeast Anatolia Region. Being present under these conditions suggest that these species might be tolerant soil and drought (Bayazit and Küden, 2007). The plants of A. orientalis present under Central Anatolia Region had an average plant height of 151 cm while they had an average of 238 cm plant height under and Southeast Anatolia Region (Bayazit and Küden, 2007). These averages suggest that this is a relatively short species and might have a potential for a dwarfing rootstock. Indeed, Atlı (2008) reported that A. orientalis can be utilized as a rootstock for cultivated almond without any incompatibility problem. The researchers also reported that while ‘Nonpareil’ grafted on ‘Texas’ gave an accumulative yield of 83.8 kg at the end of the 4-yr period, ‘Nonpareil’ grafted on A. orientalis gave 351.1 kg for the same time interval. Both A. turcomanica and A. orientalis are known as late flowering almond species. Bayazit (2007) reported that the flowering date of A. turcomanica was 3-7 d later than those of A. orientalis suggesting a possible avoidance against late spring frosts as well.

Since, as A. orientalis and A. turcomanica, wild species of almond have advantages in almond breeding, genotypes were used to determine pollen production amount, pollen viability, and pollen germination features, which are important traits to determine self-fertile genotypes, genotypes with resistance to unfavorable soil conditions including high loam and rocky soil and dwarfing rootstock and breeding of late flowering almond genotypes.

**MATERIALS AND METHODS**

Pollens of selected almond species trees from Southeast Anatolia (Gaziantep and Şanlıurfa province); A. orientalis (‘Ori 1’, ‘Ori 4’, ‘Ori 5’, ‘Ori 8’, ‘Ori 13’, ‘Ori 14’, ‘Ori B4’), A. turcomanica (Tur 6’, ‘Tur 10’, ‘Tur 11’, ‘Tur 15’, ‘Tur 5’, ‘Tur 7’, ‘Tur 8’) and P. dulcis (‘Nonpareil’, ‘Ferraduel’, ‘Tuono’) were used in the experiment. The genotypes (A. orientalis and A. turcomanica) used in the experiment were collected according to Bayazit (2007). Genotypes of ‘Ori 1’, ‘Ori 4’, ‘Ori 5’, ‘Ori 8’, ‘Ori 13’, ‘Ori 14’ and ‘Tur 6’, ‘Tur 10’, ‘Tur 11’, ‘Tur 15’ were collected from Nizip district of Gaziantep, at the same way genotypes of ‘Ori B4’ and ‘Tur 5’, ‘Tur 7’, ‘Tur 8’ were collected from Birecik district of Şanlıurfa. Collected genotypes were the natural populations grown of the region and they were not given any cultural applications. The age of orientalis genotypes were 10-29 yr and the ages of turcomanica genotypes were 10-17 yr. Almond cultivars with 10 yr age of cultivated on seed rootstock were obtained from Pozanti Agricultural Experimental Station, Çukurova University, were also used in the experiment (Table 1).

Balloon staged flower of the almond genotypes were collected, anthers were extracted and they were stored at room temperature (25 °C) in 1 d. Pollen viability and germination percentage tests were performed according to Eti (1990) method.

**Pollen viability tests**

The 2,3,5-triphenyltetrazolium chloride (TTC) and fluorescein diacetate (FDA) tests were used to determine the pollen viability rate of wild almond species and cultivars. In TTC test, 0.2 g triphenyltetrazolium chloride and 12 g sucrose were dissolved in 20 mL distilled water (Norton, 1966). One or two drops of TTC solution was put on a clean micro slide and pollen grains were sprinkled on these drops with a brush. Then, the drop was carefully covered by a cover glass without trapping air and kept for 2 h at ambient conditions. For this assay, two lamella for each genotypes and three regions of each lamella were investigated. Pollen grains were examined using a fluorescence microscope (Euromex Microscopes Holland).

| Genotype | County/City | Average age (year) | Latitude | Longitude |
|----------|-------------|--------------------|----------|-----------|
| Ori 1    | Nizip/Gaziantep | 12 37°33′37″ N | 37°29′34″ E | 786       |
| Ori 4    | Nizip/Gaziantep | 29 37°03′37″ N | 37°29′34″ E | 786       |
| Ori 5    | Nizip/Gaziantep | 18 37°03′38″ N | 37°29′32″ E | 782       |
| Ori 8    | Nizip/Gaziantep | 23 37°03′38″ N | 37°29′31″ E | 786       |
| Ori 13   | Nizip/Gaziantep | 20 37°03′39″ N | 37°27′26″ E | 845       |
| Ori 14   | Nizip/Gaziantep | 20 37°03′40″ N | 37°27′25″ E | 844       |
| Ori B4   | Birecik/Şanlıurfa | 19 37°00′34″ N | 37°50′49″ E | 385       |
| Tur 6    | Nizip/Gaziantep | 12 37°03′34″ N | 37°29′36″ E | 789       |
| Tur 10   | Nizip/Gaziantep | 16 37°03′22″ N | 37°33′39″ E | 788       |
| Tur 11   | Nizip/Gaziantep | 17 37°03′38″ N | 37°27′28″ E | 846       |
| Tur 15   | Nizip/Gaziantep | 16 37°03′41″ N | 37°27′24″ E | 842       |
| Tur 5    | Birecik/Şanlıurfa | 10 37°00′27″ N | 37°59′40″ E | 379       |
| Tur 7    | Birecik/Şanlıurfa | 13 37°03′34″ N | 37°58′34″ E | 382       |
| Tur 8    | Birecik/Şanlıurfa | 16 37°03′34″ N | 37°58′33″ E | 381       |
| Nonpareil | Pozantı | 10 36°28′05″ N | 34°53′53″ E | 1050      |
| Ferraduel | Pozantı | 10 36°28′05″ N | 34°53′53″ E | 1050      |
| Tuono    | Pozantı | 10 36°28′05″ N | 34°53′53″ E | 1050      |

Ori: Amygdalus orientalis, Tur: Amygdalus turcomanica, POZMER: Pozanti Agricultural Research Center of Çukurova University.
The viability of pollen was scored according to staining level: pollen with dark red color as viable, with light red color as semi-viable and with yellowish-green color or colorless as non-viable.

In FDA test, 2 mg fluorescent diacetate and 1.71 g sucrose were dissolved in 10 mL distilled water (Heslop-Harrison and Heslop-Harrison, 1970) and the pollen was dusted. All pollen grains, which fluoresced brightly in a fluorescence microscope, were scored as viable.

**Pollen germination tests**

The pollen germination tests were conducted on Petri dishes with 1% agar medium containing 0, 10, 15 and 20% sucrose (Eti, 1990). After the media within Petri dishes cool down to room temperature, pollen sowing was performed. For each genotype, two Petri dishes and six regions in each Petri were investigated using a fluorescence microscopy (Euromex Microscopes Holland), and percentages of germination were determined.

**Pollen production rate**

The following parameters were taken into consideration in determining the pollen production rate of the almond species: number of anthers per flower (AF); number of pollen grains per flower (PF); number of pollen grains per anther (PA) = PF/AF; percentage of well-developed pollen grains (DP).

Number of pollen grains per flower was determined using the hemacytometric method, as described by Eti (1990). The morphological homogeneity level of pollen was also tested by the same method. To obtain the average number of each component, 30 randomly selected flowers from each tree were collected. All the parameters given above for the flowers were counted and then the average number of the parameters of each almond species and cultivars was calculated.

Data were analyzed using SAS procedures (SAS Institute, 2005). The variables expressed as percentages were normalized by a root squared arcsine transformation. The means and standard deviations were calculated using the TABULATE procedure (SAS Institute, 2005). The General Linear Model (GLM) procedure was used to calculate ANOVA tables, where significant differences between means were separated by Tukey at 5%.

**RESULTS AND DISCUSSION**

**Pollen viability**

The results of TTC and FDA tests (Table 2) showed that there were significant differences among the genotypes for pollen viability. The TTC test showed that pollen viability means of *A. orientalis* (82.8%) and *A. turcomanica* (84.1%) were higher than the cultivars (76.6%). The FDA tests results showed that pollen viability of *P. dulcis* (88.2%) species was higher than those of the wild and cultivated almond species.

### Table 2. The percentage of pollen viability by 2,3,5-triphenyltetrazolium chloride (TTC) and fluorescein diacetate (FDA) tests in *Amygdalus orientalis*, *A. turcomanica* and *Prunus dulcis* genotypes.

| Genotype     | TTC Viable | TTC Semi-Viable | TTC Non-Viable | FDA Viable | FDA Non-Viable |
|--------------|------------|-----------------|----------------|------------|----------------|
| Ori 1        | 94.5a      | 2.7de           | 2.8e           | 46.4f      | 53.6a          |
| Ori 4        | 80.8b-f    | 2.8de           | 16.4a-e        | 45.9f      | 54.1a          |
| Ori 5        | 83.4a-e    | 9.1bc           | 7.5-e          | 48.7f      | 51.3a          |
| Ori 8        | 66.7g      | 13.9ab          | 19.4ab         | 51.8d-f    | 48.2a-c        |
| Ori 13       | 88.7a-c    | 7.9cd           | 3.4de          | 72.0bc     | 28.0de         |
| Ori 14       | 69.5g      | 10.0bc          | 20.5a          | 40.9f      | 59.2a          |
| Ori B4       | 87.7a-c    | 5.0e-c          | 7.3-c-e        | 69.9b      | 30.1d          |
| Tur 6        | 88.4a-c    | 2.3e            | 9.3b-e         | 50.6e      | 49.4ab         |
| Tur 10       | 81.9b-e    | 7.0e-c          | 11.0a-e        | 62.9e-c    | 37.2b-d        |
| Tur 11       | 78.0-g     | 9.9bc           | 12.1-a-e       | 51.9d-f    | 48.1a-c        |
| Tur 15       | 86.2-a-d   | 7.0-c-e         | 6.8-c-e        | 50.3ef     | 49.7ab         |
| Tur 5        | 92.5ab     | 5.3-c-e         | 2.3e           | 65.5cd     | 34.6cd         |
| Tur 7        | 79.0-c-f   | 7.6-c-e         | 13.4a-d        | 42.2f      | 57.8a          |
| Tur 8        | 83.0a-e    | 6.9-c-e         | 10.1-a-e       | 42.6f      | 57.4a          |
| Nonpareil    | 75.4a-g    | 16.2a           | 8.5-c-e        | 90.2a      | 9.8f           |
| Ferraduel    | 73.6e-g    | 14.6ab          | 11.8a-e        | 82.4b      | 17.6ef         |
| Tuono        | 80.9-b-f   | 6.9-c-e         | 12.2a-e        | 91.9a      | 8.1f           |
| HS_25        | 12.0       | 5.5             | 10.5           | 13.8       | 13.8           |
| A. orientalis| 82.8       | 7.3             | 11.1           | 53.6       | 46.4           |
| A. turcomanica| 84.1       | 6.6             | 9.3            | 52.3       | 47.7           |
| P. dulcis    | 76.6       | 12.5            | 10.8           | 88.2       | 11.8           |
| Mean         | 81.2       | 8.8             | 10.4           | 64.7       | 35.3           |

Ori: *Amygdalus orientalis*, Tur: *Amygdalus turcomanica*.

In TTC test, the highest rate of viability (94.5%) was obtained from genotype ‘Ori 1’ and the lowest germination rate of 66.7% was obtained from genotype ‘Ori 8’. In TTC test, the percentage of semi-lived pollen of *A. orientalis* and *A. turcomanica* species were found close to each other (7.3% and 6.6%, respectively), whereas the other cultivated almond varieties showed a value bigger than 12.5%. Non-viable pollen rates did not differ much among the three almond species.

The FDA test results showed that mean pollen viability of *A. orientalis* (53.6%) and *A. turcomanica* (52.3%) were close to each other while pollen viability of cultivated almond species was 88.2%. The highest rate of pollen viability in the FDA test results was obtained from ‘Nonpareil’ (90.2%) and ‘Tuono’ (91.9%) cultivars. The lowest value, as similar to TTC test, belongs to ‘Ori 14’ (40.2%). The highest viability rates in *A. orientalis* almond type was 72.0% for ‘Ori 13’, and in *A. turcomanica* almond type was 65.5% for ‘Tur 5’ in FDA. Eti et al. (1993) have reported that pollen viability of some almond genotypes vary year by year, and TTC test results showed the highest rates of 58.3% in 1988 and rates of 82.2% in 1990. The FDA viability test results, 37.9-71.6% (1989 year) with 29.5-91.2% (1990 year), have been reported for different almond species. Tosun et al. (2007) determined that pollen viability of almond genotypes varies year by year, and TTC test results were similar to values reported by Eti et al. (1993) and Tosun et al. (2007).
Pollen germination

Pollen germination percentages (Table 3) varied depending on species, genotypes and sucrose dose. Mean pollen germination percentages of *A. orientalis* almond species in 10% sucrose medium was 53.7%, in 15% sucrose medium was 29.5%, and in 20% sucrose medium was 36%, respectively. *A. turcomanica* species showed 53.7%, 38.3% and 16.2% in the same media. Pollen germination species showed 53.7%, 36%, respectively.

Pollen germination medium was 29.5%, and in 20% sucrose medium was 16%. Pollen grains showed some variation in germination species, genotypes and sucrose dose. Mean pollen germination percentage (1991) reported that diverse fruits species’ and cultivars’ pollen germination percentages (77.1%) medium containing 15% sucrose. Eti *P. dulcis* type showed the highest germination rates obtained from ‘Ori 5’ (88.5%), ‘Ori 13’ (86.4%), ‘Nonpareil’ (76.3%) and ‘Tur 6’ (76.3%). ‘Ori 4’, and ‘Ori 14’ had the lowest germination percentages (6.9 and 2.4%, respectively). Dicenta *et al.* (2002) reported that pollen germination percentages of self pollinated almond species ranged 36.0-74.0%. Sharafi *et al.* (2010) indicated that pollen germination percentages of almond genotypes ranged 35.0-82.0% in 15% sucrose containing media. Our findings were generally similar to those results. Observed differences may be attributed to the effects of almond species on germination percentages.

When the pollen viability and germination values are considered, it can be concluded that these genotypes can be used as pollinators for those almond species that bloom in the same period. It is worth to point out that the high germination rates found in *vitro* do not always indicate a good outcome in *vivo* pollination for any cross combinations. To be a good pollinator, the amount of pollen of variety should be high, as well as the higher ability and germination percentage has great importance (Stossler, 1984; Eti, 1990). The findings of our study emphasized the potential importance of investigated wild almond species for *in vivo* pollination study.

Pollen production

The number of the anther within each flower was dependent on almond species and genotypes, and the anther numbers per flower were significantly different (Table 4). The value of cultivated almond species was 29.0 anthers per flower. Number of anthers per flower for *A. orientalis* almond species were ranged 15.6 (‘Ori 5’)-26.6 (‘GA 13’) with a mean of 21.0 anthers per flower.

Number of anthers per flower of *A. turcomanica* species ranged 10.2 (‘Tur 5’)-18.0 (‘Tur 11’) and the mean value was 13.9. Anther number per flower of the *A. turcomanica* species was lower than the other two species used in the experiment. Godini (1981) reported that the anther number per flower of the cultivated almond cultivars ranged 20.4-37.2.

Pollen numbers within an anther varied depending on almond species and genotypes. Pollen number per anther of *A. orientalis* species ranged 1623 (‘Ori 8’)-2669 (‘Ori 4’) with an average of 2185. Pollen number per anther of *A. turcomanica* species ranged 775 (‘Tur 6’)-3220 (‘Tur 5’) and the mean value for pollen number was 1932. Pollen number of *A. orientalis* and *A. turcomanica* species was lower than the cultivated variety(ies) (1146) used in the experiment. Godini (1981) reported that the pollen number of some almond cultivars was specific to years and the number ranged from 1099 to 1787. Previous studies have shown that the pollen number per anther of apricot ranged 1574-3757 (Mahanoglu *et al.*, 1995) and 1211-3042 (Asma, 2008) of cornelian cherry ranged 182-3418 (Pirlik and Güleyüz, 2005). Our results are similar to these previously published stone fruit species.

The number of pollen grains per flower within almond genotypes used in the experiment was specific to genotypes and species and thus, they were significantly different (Table 4). The mean pollen grain number per

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Table 3. The germination percentages of pollen by agar in Petri dish in *Amygdalus orientalis, A. turcomanica* and *Prunus dulcis* genotypes.

| Genotype | Sucrose concentration (%) |
|----------|---------------------------|
|          | 0  | 10  | 15  | 20  |
| Ori 1    | 0.0| 71.5b|66.9c|71.8ab|
| Ori 4    | 0.0| 6.9b |5.3g |5.9gh|
| Ori 5    | 0.0| 88.5a|83.9a|70.0ab|
| Ori 8    | 0.0| 65.5cd|46.4de|34.9d|
| Ori 13   | 0.0| 86.4ab|2.1g |51.3c|
| Ori 14   | 0.0| 2.4b |2.1g |1.6h|
| Ori B4   | 0.0| 54.6def|0.1g |16.1efg|
| Tur 6    | 0.0| 76.3abc|48.6de|19.4ef|
| Tur 10   | 0.0| 48.2fg|23.3f |12.4efh|
| Tur 11   | 0.0| 48.5efg|39.4e |0.0f|
| Tur 15   | 0.0| 50.8d-g|47.7de|28.9d|
| Tur 5    | 0.0| 62.0c-f|53.8d |33.3d|
| Tur 7    | 0.0| 50.8d-g|28.2f |9.6fgh|
| Tur 8    | 0.0| 37.9g |27.7f |9.5fg|
| Nonpareil| 0.0| 76.3abc|77.2ab|78.9a|
| Ferraduel| 0.0| 64.8ede|70.1bc|60.4bc|
| Tuono    | 0.0| 85.8ab|84.2a |81.3a|
| HSD0.05  | 16.6|10.1|13.2|

Ori: *Amygdalus orientalis*, Tur: *Amygdalus turcomanica*.
flower of the cultivated almond species was 31 335. Pollen grain number per flower of A. orientalis species ranged 33 824 (‘Ori 8’)-66 075 (‘Ori 13’) and the average value was 46 114. Pollen number per flower of A. turcomanica species ranged 12 726 (‘Tur 6’)-55 298 (‘Tur 15’) and the average value was 25 557. Godini (1981) reported that the pollen number of some almond cultivars’ flower ranged from 36 960 to 56 776 whereas Traynor (2001) found a range of 42 000-67 000. The value for pollen grain numbers/flower of the three species used in our experiment was in agreement with the previous works. In terms of pollen amount within a flower, within anther and morphological homogeneity A. orientalis had significantly higher values than the other two almond species (Table 4). Pollen viability, pollen germination and pollen production amount of A. orientalis and A. turcomanica almond species were close to cultivated almond species. The data suggested that these species were as important as cultivated species in terms of pollen production amount and pollen quality. Although, pollen viability of ‘Ori 4’ and ‘Ori 14’ genotypes within A. orientalis species were higher than 70%, germination percentages lower than 7% showed that these genotypes were not suitable for almond hybridization works.

### CONCLUSIONS

A vast number of fruit research have recently emphasized the importance of the fruit genetic recourses. This resources not only needs to be not collected, characterized and maintain, but also should be utilized in plant breeding programs. Similar to other fruit species, the almond breeders have been concentrated on the higher yielding and quality genotypes; and this have been resulted in production of relatively few cultivars worldwide. However, this approach is not a powerful strategy for adaptability to undesirable conditions. To cope with this, more almond species should be utilized in the almond breeding programs and the genetic base should be broadened. The wild almond species of Turkey are present in the unfavorable ecological conditions such as high and low temperatures, low precipitation, high salinity, high pest and disease pressure, therefore, it seems a plausible option to search for resistance against these stress factor among the wild almond genotypes from several species. Boarding the genetic bases of almond is a beneficial strategy for many other reasons including a possible resistance to the stress factor that may arise in the future. Findings of our experiment showed that pollen of genotypes within A. orientalis and A. turcomanica almond species could be used for breeding and improving cold-resistance and self-fertile almond cultivars. It is important that before beginning any hybridization work, pollen viability should be determined first, and then the hybridization studies can be performed. In this way, efficiency of hybridization program of almond species can be increased. Taken together, A. orientalis and A. turcomanica species offer a great potential for the almond improvement. Therefore, crossing studies between these wild species and the cultivated almonds will be initiated for almond breeding programs.

| Genotype | Anther number/flower | Pollen number/flower | Pollen number/flower | Morphological homogeneity (%) |
|----------|----------------------|----------------------|----------------------|-----------------------------|
| Ori 1    | 18.3d-h              | 2185a-e              | 39 850a-e            | 88.6a-c                     |
| Ori 4    | 22.4c-f              | 2019a-f              | 45 804d-e            | 82.3a-d                     |
| Ori 5    | 15.6f-f              | 2536a-c              | 39 176a-f            | 88.4a-c                     |
| Ori 8    | 20.8c-f              | 1623b-f              | 33 824f              | 87.7a-c                     |
| Ori 13   | 26.6a-c              | 2486a-d              | 66 075a              | 96.3a                       |
| Ori 14   | 24.5b-d              | 1937a-f              | 47 314a-c            | 81.3b-d                     |
| Ori B4   | 19.0d-g              | 2669a-c              | 50 536b              | 83.3a-d                     |
| Tur 6    | 16.5e-f              | 775c                 | 12 726f              | 83.4a-d                     |
| Tur 10   | 12.0g-i              | 1345f                | 15 963f              | 78.1ed                      |
| Tur 11   | 18.0d-h              | 1477c-f              | 19 209d              | 65.2e                       |
| Tur 15   | 17.6d-h              | 3022ab               | 55 298b              | 94.0ab                      |
| Tur 5    | 11.2h                | 3220a                | 36 008b              | 69.3d                       |
| Tur 7    | 10.2b                | 2088a-f              | 21 392c              | 86.4a-c                     |
| Tur 8    | 11.7g-i              | 1595b-f              | 18 305ef             | 79.5c-e                     |
| Nonpareil| 30.1ab               | 710f                 | 21 365c              | 77.8c-e                     |
| Ferraduel| 23.4b-e              | 1656b-f              | 36 704f              | 88.2a-c                     |
| Tuono    | 33.6a                | 1072d-f              | 35 935b-f            | 87.1a-c                     |
| HSD0.05  | 7.4                  | 1140                 | 26 817               | 14.5                        |
| A. orientalis | 21.0            | 2185                 | 46 114               | 86.6                        |
| A. turcomanica | 13.9         | 1932                 | 25 557               | 79.4                        |
| P. dulcis | 29.0              | 1146                 | 31 335               | 84.4                        |
| Mean     | 17.4                | 1754                 | 34 335               | 83.4                        |

Table 4. The values of pollen production components in Amygdalus orientalis, A. turcomanica and Prunus dulcis genotypes.

**Orí: Amygdalus orientalis, Tur: Amygdalus turcomanica.**
los genotipos *A. orientalis* y *A. turcomanica* mostraron mayores tasas de germinación en 10% sucrosa. El número de anteras por flor fue mayor en los cultivares mientras el número de granos de polen fue menor en otras especies de almendro. Mientras el número de granos de polen por flor fue relativamente alto en genotipos de *A. orientalis*, la calidad del polen fue alta en las tres especies en investigación. Los resultados sugirieron que estas dos especies, *A. orientalis* y *A. turcomanica*, podrían ser usadas para futuros programas de mejoramiento de almendros.

**Palabras clave:** *Amygdalus orientalis*, *Amygdalus turcomanica*, *Prunus dulcis*, polen, germinación.

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