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ers open corresponds to the order in which they are developed, thus starting with the uppermost (terminal) flower and proceeding downwards through laterals. This characteristic is very important as flowers which open first, have usually the greater chance to be pollinated, set fruit and reach maturity than flowers which open later. The aim of this study was to characterize differences in phenological (flowering time), morphological (pedicel length, flower diameter, petal and sepal numbers, number and length of stamens, number and length of stigmas) and biological (fruit set, duration of stigma receptivity, duration of anther dehiscence, nectar quantity and sugar content of nectar, pollen viability) features of 'Melrose' apple flowers. Results showed that the opening time of the flowers was greatly influenced by their position on the inflorescence; the terminal flower opened first, followed by the third or fourth and more basal flowers, and lastly by the sub-terminal flower. Morphological characters also varied with position on the cluster; terminal flower had significantly shorter pedicel compared with laterals, however, differences were not observed among laterals. Other morphological traits such as flower diameter, number of petals/sepals/stamens/stigmas did not show positional differences. Fruit set of terminal flower was usually far greater than laterals, and closely followed the order of flowering. While the duration of stigma receptivity and nectar production were significantly affected by the position on the cluster (terminal flower had longer stigma receptivity and greater nectar production), anther dehiscence, sugar content of the nectar and pollen viability did not differ significantly between terminals or laterals.

Sm09.026

Stigma Receptivity and Pollen Tube Development in Different Peach Genotypes and Temperature

Zanandrea, I.; Raseira, M. C. B.; Silveira, T. M. T.

EMBRAPA CLIMA TEMPERADO, BR 392, KM 78, P.O. BOX 403, 96001-970, PELOTAS, RIO GRANDE DO SUL, BRAZIL

The stigma receptivity period may vary according to the genotype and weather conditions, especially temperature. The present work aimed to evaluate the receptivity period as well as the degree of pollen tube development, under the temperature of 29°C and room temperature (between 16 °C and 20 °C). The genotypes evaluated were selections from the Embrapa peach breeding program Conserva 693, 1054, 1186, 1187, 1218 and 1566. Small cut flower branches were placed in vials with water. Half of them were left at room temperature and the others taken to the phytotron. Flower buds at balloon stage were emasculated and pollinated at different times (0, 24, 48 and 72 hours). The experimental design was completely randomized with three replications and ten flowers per plot. The pistils were observed under light microscope using lacmoid as a differential stain. The receptivity was estimated attributing a degree, based on the observed number of germinated pollen present on the stigma. The pollen tube development was evaluated according to the length of it compared with the pistil length. At room temperature, Conserva 1054 and 1187 had a higher pollen germination 24 hours after emasculation, however it did not differ from the results at 48 hours. All other genotypes had a higher percentage at 48 hours. At 29 °C, the percentage of pollen germination on the stigma was higher 24 and 48 hours after emasculation, differing from immediately pollinated and 72 hours, with exception of Conserva 1566, in which 72 hrs had equal results that 24 and 48 hrs. The pollen tube development was higher when pollination was done 24 hrs and 48 hours after emasculation, regardless of the temperature. All genotypes had slower pollen development at 29 °C, in the 72 hours treatment, with exception of Conserva 1566. Based on the results, the hypothesis is that Conserva 1566 may be more tolerant to high temperature peaks at blooming.

Sm09.027

The Variation of Style Ca²⁺ Location and Structural after Calmodulin Treatment on Self- and Cross-Pollination in *Pyrus pyrifolia* L.

Jiang, X. T.; Zhang, S. L.; Tao, S. T.

NANJING AGRICULTURAL UNIVERSITY, NO.1 WEIGANG STREET, 210095, NANJING, JIANGSU, CHINA

Self-incompatibility (SI) is an important mechanism to prevent self-fertilization, with Pear (*Pyrus pyrifolia* L.) exhibiting a (S-RNase)-based gametophytic SI mechanism. S-RNases have also been implicated in the rejection of self-pollen and geneti-

cally identical pollen. Since it was discovered in the late 1960s, calmodulin (CaM) has been described as a multi-functional receptor for intracellular Ca²⁺ in regulating protein activity as well as gene expression. In the early 1980s, CaM was found outside of animal and plant cells, and has extracellularly regulated multiple important biological functions. In this paper, the effects of CaM and anti-CaM serum on pollen germination and tube growth have been studied *in vivo* and *in vitro* by optical microscopy and fluorescence microscopy, respectively. It was found that 10-7M CaM and anti-CaM serum could promote pollen germination and tube growth in situations of SI *in vivo* and *in vitro*, and dilution 1:200 anti-CaM serum inhibited germination and growth. The localization of Ca²⁺ in the style was determined after CaM and anti-CaM serum treatment on self- and cross-pollination was studied *in vivo* by electron microscopy. The results showed that there was no calcium precipitate in non-pollinating plants, while the [Ca²⁺] in intercellular spaces increased with the prolonging of pollination time. There were many calcium-rich crystals in the self-pollination style intercellular spaces after 72 hours post-pollination and there were no crystals in the cross-pollination style. After CaM treatment, the calcium-rich crystals in the intercellular spaces were found to disappear in the self-pollination style, while vacuolar [Ca²⁺] was found to increase. After anti-CaM serum treatment, both the volume of and [Ca²⁺] in intercellular spaces increased. This presents unequivocal evidence that CaM has an effect on pollination style physiology in self-incompatibility.

Sm09.028

Pollen and Pistil Features Involved in the Reproductive Biology of the Olive (*Olea europaea* L.)

Rodríguez-García M. I.; Alché J. D.; Castro A.J.; Suarez C. G.; Rejón J. D.

ESTACIÓN EXPERIMENTAL DEL ZAIDÍN (CSIC), DEPARTMENT OF BIOCHEMISTRY, CELL AND MOLECULAR BIOLOGY OF PLANTS, PROFESOR ALBAREDA 1, E-18008, GRANADA, SPAIN

Despite the importance of sexual reproduction for fruit formation, little attention has been paid to this topic in the olive until present. For instance, both the intra- and intercultivar incompatibility/compatibility relationships are not well understood in this species of great agronomical value. To decipher the molecular mechanisms involved in this process, it is essential to have a previous knowledge of the reproductive structures and their behavior during the progamic phase. In the present work, we have studied the cellular features involved in pollen-pistil interaction in the olive and how these features might affect the compatibility/incompatibility relationships in this species. At maturity, the olive pollen grain is bicellular, containing large amounts of storage lipids (oil bodies) in the cytoplasm of the vegetative cell. The crevices of the sculpted exine are filled with lipoidal deposits derived from the *tapetum*, which provides the pollen grain with an sticky coating. After being released, the olive pollen has a long life span and is easily germinated *in vitro*. At anthesis, the olive pistil is composed of a bilobed wet stigma covered with intact surface cells that protrude as papillae, a solid style and a bilocular ovary containing four ovules. The stigma receptivity is optimal when the flower is fully opened and the anthers are turgid but not dehiscent. At this moment, the stigma surface is coated by a viscous secretion containing proteins, lipids and polysaccharides. The funnel-shaped subpapillar and transmitting tissues are similar in their structure and composition, and constitute the path through which pollen tubes must grow. Numerous pollen tubes germinate and grow through the stigma, a few of them reach the style, and only one or two ovules are fertilized. All these features have been associated to the existence of a gametophytic-type self-incompatibility system.

Sm09.029

Pollen-Pistil Interaction in Mandarins: Histological, Biochemical and Molecular Analysis

Distefano, G.¹; Las Casas, G.¹; Caruso, M.¹; La Malfa, S.¹; Del Duca, S.²; Herrero, M.³; Gentile, A.¹

¹DIPARTIMENTO DI ORTOFLOROARBORICOLTURA E TECNOLOGIE AGROALIMENTARI, UNIVERSITY OF CATANIA, VIA VALDISAVOIA 5, 95123, CATANIA, ITALY

²DIPARTIMENTO DI BIOLOGIA EVOLUZIONISTICA SPERIMENTALE, UNIVERSITY OF BOLOGNA, ITALY

³DEPARTAMENTO DE POMOLOGIA, ESTACIÓN EXPERIMENTAL DE AULA DEI, CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS, ZARAGOZA, SPAIN

Parthenocarpic processes and pollen-pistil incompatibility characterize the repro-