‘Vayro’, ‘Marinada’, ‘Constantí’, and ‘Tarraco’ Almonds

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Almond [Prunus amygdalus Batsch syn. P. dulcis (Mill.) D.A. Webb] is the main tree nut crop in world production. Successful almond production requires cultivars adapted to the environmental conditions of the growing region. Thus, in wide areas of the Mediterranean Basin, cultivars have to be adapted to avoid late spring frost by late flowering. In California, delayed flowering can help to avoid rain damage at bloom time. A number of agronomic and commercial features (self-compatibility, production, vigor, growth and branching habit, training and pruning ease, disease resistance, nut quality, and so on) are also very important in almond production.

The availability for making crosses of a range of cultivars (late flowering and self-compatible from Apulia, southern Italy, very late blooming from Ukraine, high nut quality from Spain and France, and so on) and selections derived from controlled crosses have enhanced the prospects of almond breeding (Godini, 1996; Grasselly and Crossa-Raynaud, 1980; Socias i Company, 1990; Vargas et al., 1984). With these aims, in the almond breeding program of IRTA Mas de Bover, active since 1975, more than 35,000 seedlings have been raised and a few cultivars selected. The first cultivars registered from this program were ‘Masbovera’, ‘Glorieta’, and ‘Francolí’, which are widely grown in Spain (Vargas and Romero, 1994).

Four new late-blooming almond cultivars, ‘Vayro’, ‘Marinada’, ‘Constantí’, and ‘Tarraco’, have been released. ‘Vayro’ (Breeder’s reference IRTAMB A21-323), ‘Marinada’ (IRTAMB A23-57), ‘Constantí’ (IRTAMB A22-120), and ‘Tarraco’ (IRTAMB A21-169) are seedlings selected from different crossing origin. In Figure 1, the pedigree of the four cultivars is presented. The crosses were made in 1991 to 1994. The four selections have been assessed during 9 to 12 years at Mas de Bover, Tarragona, and since 2000 are being evaluated at different locations in Spain.

Description

Main vegetative and agronomic characteristics are presented on Tables 1 and 2. Table 3 shows some important commercial nut traits (Figs. 2–5). In the three tables, widely grown reference cultivars (‘Desmayo Largueta’, ‘Ferragnes’, ‘Guara’, ‘Marcona’, ‘Masbovera’, and ‘Nonpareil’) are included for comparison. In Table 4, the productive performance of the three self-compatible cultivars (‘Vayro’, ‘Marinada’, and ‘Constantí’) compared with two self-fertile and highly productive standard cultivars (‘Lauranne’ and ‘Guara’) is given.
‘Vayro’. It was bred from a ‘4-665’ × ‘Lauranne’ cross made in 1991. It is late-flowering, self-fertile, very productive, and precocious. The tree shows very strong vigor and medium branch density, bearing nuts mainly on spurs. It seems tolerant to Phomosis amygdali. The kernel is nice, without doubles, having medium size and a pointed shape.

‘Marinada’. It is a seedling from a ‘Lauranne’ × ‘Glorieta’ cross made in 1994. It flowers very late, is self-fertile, highly productive, and very precocious. The tree shows midvigor and has medium–upright growth and branch density, bearing nuts mainly on spurs. The kernel shape is round.

‘Constanti’. It is an open-pollinated seedling from the selection ‘FGFD2’, obtained in 1993. It is late-flowering, self-fertile, productive, and precocious. The tree is vigorous and has a medium–upright growth. Its branch density is medium, bearing nuts mainly on spurs. The kernel is large, nice, without doubles, and has an oblong shape.

All four cultivars (‘Vayro’, ‘Marinada’, ‘Constanti’, and ‘Tarraco’) have shown heavy and consistent cropping in experimental trials.

| Cultivar | Mean blooming date (STD) | Self-compatibility (Sr genotype) | Yield potential | Bearing precocity | Harvesting season |
|----------|--------------------------|----------------------------------|-----------------|------------------|------------------|
| Vayro    | 26.6 (7.8)               | Yes (SrSr)                        | Very high       | Early            | Early            |
| Marinada | 35.1 (10.7)              | Yes (SrSr)                        | Very high       | Very early       | Mid              |
| Constanti| 27.4 (9.5)               | Yes (SrSr)                        | High–very high  | Early            | Mid              |
| Tarraco  | 36.1 (11.2)              | No (SrSr)                         | Very high       | Very early       | Mid              |

Reference:
D. Largueta 0 No (SrSr) Mid–high Mid-late Late
Ferragnes 29.4 (8.9) Yes (SrSr) Mid–high Mid Mid
Guara 27.7 (9.3) Yes (SrSr) High–very high Early Early
Marcona 15.6 (5.3) Yes (SrSr) High–very high Early Early
Masbovera 29.8 (9.8) No (SrSr) Low–mid Mid Mid
Nonpareil 18.0 (7.1) No (SrSr) Low–mid Mid Mid

Nonpareil is not well adapted to Catalonian environmental and growing conditions (low production).

Fig. 2. ‘Constanti’ almonds.
Fig. 3. ‘Marinada’ almonds.
Fig. 4. ‘Tarraco’ almonds.
Fig. 5. ‘Vayro’ almonds.
As to establishing new almond orchards and design according to flowering time and vigor (related to tree spacing), two cultivar pairs can be considered: ‘Marinada’ and ‘Tarraco’ (very late-blooming and mid-vigor) and ‘Vayro’ and ‘Constanti’ (late-blooming and strong vigor). They set better crops when bees are placed in their orchards.

**Availability**

The four cultivars bred by IRTA are in the process of being registered by the Oficina Española de Variedades Vegetales (OEVV) belonging to the Spanish Ministry of Agriculture, Fish and Food (MAPA). The cultivars can be propagated under royalty agreements with IRTA. Limited amounts of virus-free budwood for research purposes are available from IRTA Mas de Bover after signing a nonpropagation agreement (www.irta.es). IRTA has granted a multiplication license for the four cultivars to ALMERIPLANT (www.almeriplant.com).

**Literature Cited**

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**Table 2.** Tree vigor, growth habit, branching density, bearing habit (mostly), and training and pruning ease.

| Cultivar | Vigor  | Growth habit | Branching density | Bearing habit | Training | Pruning |
|----------|--------|--------------|-------------------|--------------|----------|---------|
| New:     |        |              |                   |              |          |         |
| Vayro    | Very strong | Medium | Mid | On spurs | Very easy | Easy |
| Marinada | Mid    | Medium–upright | Mid–scarce | On spurs | Very easy | Very easy |
| Constanti | Strong | Medium–upright | Mid | On spurs | Very easy | Easy |
| Tarraco  | Mid    | Medium–upright | Mid–scarce | On spurs | Very easy | Very easy |

**Reference:**

D. Largueta

**Table 3.** Nut characteristics.

| Cultivar | No. | Nut wt | Kernel wt | Shelling percentage | Double kernels | Kernel appearance |
|----------|-----|--------|-----------|--------------------|----------------|-------------------|
| New:     |     |        |           |                    |                |                   |
| Vayro    | 29  | 4.2 (0.5) | 1.19 (0.15) | 28.4 (2.6) | 0.1 (0.3) | 7.0 (0.5)         |
| Marinada | 24  | 4.2 (0.5) | 1.30 (0.19) | 31.1 (3.6) | 0.3 (0.6) | 6.8 (0.6)         |
| Constanti | 32  | 4.5 (0.6) | 1.20 (0.16) | 26.8 (2.7) | 1.4 (1.6) | 6.2 (0.6)         |
| Tarraco  | 17  | 5.4 (1.1) | 1.68 (0.25) | 31.5 (4.2) | 0.1 (0.3) | 6.9 (1.0)         |

Reference:

D. Largueta

**Table 4.** Mean year and accumulated production of kernel (kg/tree).

| Cultivar | 2002 | 2003 | 2004 | 2005 | 2006 | Accumulated production (2002–2006) |
|----------|------|------|------|------|------|-----------------------------------|
| New:     |      |      |      |      |      |                                   |
| Vayro    | 0.61 b | 4.04 b | 5.39 a | 5.54 a | 6.35 a | 21.93 a                           |
| Marinada | 1.66 a | 5.16 a | 2.50 b | 5.23 a | 4.57 abc | 19.13 ab                         |
| Constanti | 0.57 b | 3.74 b | 2.27 b | 4.59 a | 2.74 c | 13.91 b                          |

Reference:

Guara

**Table 4.** Mean year and accumulated production of kernel (kg/tree).

| Cultivar | 2002 | 2003 | 2004 | 2005 | 2006 | Accumulated production (2002–2006) |
|----------|------|------|------|------|------|-----------------------------------|
| New:     |      |      |      |      |      |                                   |
| Vayro    | 0.61 b | 4.04 b | 5.39 a | 5.54 a | 6.35 a | 21.93 a                           |
| Marinada | 1.66 a | 5.16 a | 2.50 b | 5.23 a | 4.57 abc | 19.13 ab                         |
| Constanti | 0.57 b | 3.74 b | 2.27 b | 4.59 a | 2.74 c | 13.91 b                          |

| Reference: | 
| Guara | 0.32 b | 3.59 b | 2.16 b | 5.21 a | 4.80 ab | 16.08 ab |
| Lauranne | 0.47 b | 3.99 b | 3.87 ab | 5.31 a | 4.14 bc | 17.76 ab |

**Use**

As to establishing new almond orchards and design according to flowering time and vigor (related to tree spacing), two cultivar pairs can be considered: ‘Marinada’ and ‘Tarraco’ (very late-blooming and mid-vigor) and ‘Vayro’ and ‘Constanti’ (late-blooming and strong vigor). They set better crops when bees are placed in their orchards.