7th International Table Grape Symposium

Mildura Victoria, Australia

12-14 November, 2014

ATGA Australian Table Grape Association Inc

HAL Horticulture Australia

Welcome to Mildura

Organising Committee's foreward

Dear 7th International Table Grape Symposium Participants,

On behalf of the 7th International Table Grape Symposium (7ITGS) Organising Committee and the Australian Table Grape Association (ATGA), we formally welcome you to Mildura, Australia for the 7ITGS.

Held every three to four years, the symposium is the premier international event for the table grape industry, presenting the latest scientific research into table grape production to an audience of more than 250 delegates from around the world. This year is especially significant in that it marks the event's 20th anniversary. The symposium's history can be traced back to 1994 in Anaheim, California, almost 20 years ago. Since then it has been held in South Africa, Chile, California and now Australia.

The 7ITGS will be held at the recently renovated Mildura Arts Centre (MAC), in the heart of the Australia's Sunraysia table grape production region and will showcase the very best of what regional Australia has to offer.

Irrigation in the Sunraysia region was established 1886 by George and William Chaffey, Australia's first irrigation scheme. The Chaffey brothers were approached by the then Victorian Premier Alfred Deakin who was under pressure to open up more land for farming and settlement. Now Mildura is the heart of Australia's largest table grape producing region and gateway to the iconic junction of the Murray and Darling Rivers.

The 7ITGS has attracted much international interest. The oral program is packed with presentations from over 40 presenters from a range of countries including Australia, the United States, Israel, Italy, Portugal, South Africa, Chile, Brazil, Spain and Argentina. The poster session also contains an impressive array of presentations from over 30 different authors.

In addition delegates are treated to a great social program with plenty of networking opportunities. This includes an impressive indigenous cultural experience during the Welcome ceremony, grand Symposium Gala Dinner, Murray River Paddleboat cruise and post-symposium tour of the Sunraysia table grape production region.

We thank all those who have assisted during the organisation of the symposium and its proceedings, especially the speakers and the generosity of our valued sponsors for without their support this event would not be possible.

The Organising Committee is confident that your journey to Australia will be worthwhile both professionally and personally. We hope you value this 7ITGS event and we look forward to showcasing the very best of what Australia has to offer.

Yours sincerely,

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Mark Krstic AWRI
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Rachael McClintock R&D Viticultural Service

ID 3

Agronomic and qualitative performances of some table grape Dalmasso crosses (*Vitis vinifera* L.) grown in Piedmont (NW of Italy)

Antonio Carlomagno, Alessandra Ferrandino, Olga Kedrina and Vittorino Novello*

Dipartimento di Scienze Agrarie, Forestali ed Alimentari, Università di Torino, Largo P. Braccini 2, I-10095 Grugliasco (TO), Italy
*Corresponding author: Tel: +39011 670 8758, Email: vittorino.novello@unito.it

Background and Aims

Table grape cultivation in Italy covers an area of 37,305 hectares (Istat, 2010) with an average farm size of 2ha. Global production of table grapes is over 20.7 million tons (OIV, 2008). Asian countries are the major producers and China is the world leader with 4.6 million tons. Italy produces 1.3 million tons of which 0.8 million tons is for internal consumption.

In Europe, Italy is the main producer and exporter of table grapes (Lamacchia, 2013). Production is concentrated in Southern Italy, mainly in the Apulia and Sicily regions, where the climate conditions are most favourable. The varieties most widely grown and consumed are Victoria (white) and Black Magic in the early part of the season and Italia (white) and Red Globe in the later part of the season. In Italy, seeded varieties are more widespread than seedless varieties as the commercially available seedless varieties (e.g. Sugraone and Crimson Seedless) require different approaches to in agronomic management. Specific management practices required for seedless varieties include long pruning systems (6-7 canes with at least 30 buds per vine), high planting distances, polyethylene film covering, fertigation and the use of growth regulators to produce a satisfactory product. In Italy the consumers prefer the traditional and local varieties with seeds, whereas the foreign consumers prefer to eat seedless varieties, especially in Northern Europe. To satisfy these markets, several new seedless varieties have been introduced by Italian growers (such as Apulia, Summer Royal, Midnight Beauty, Sophia Seedless, etc.).

The Piedmont region, located in Northwest Italy, is famous for the production of several premium wines and wine viticulture is widespread, especially in the hilly areas. However, in these areas, there is only minimal production of table grapes which are used for family consumption and grown in association with other tree fruits rather than in specialised vineyards. Usually, local consumers buy table grapes imported from Southern Italy or other countries (e.g. Chile, Argentina, South Africa, etc.) at the fruit and vegetable markets.

Apples, pears, peaches, plums and kiwifruit are widely cultivated in the plains at the foot of the Alps. However in recent years, growers have been forced to eradicate their kiwifruit orchards because of a major outbreak of the pathogen, *Actinidia bacteriosis* (*Pseudomonas syringae pv. actinidiae*). Table grape growing may provide an alternative crop for these growers and also reuse the kiwifruit orchard trellis structure.

In order to promote the development of the local table grape market, diversify the growers' source of income and offer an alternative to the production of kiwifruit, a recovery and enhancement program of some table grape Dalmasso crosses produced by Prof. Dalmasso has begun. He commenced a program of crossbreeding in 1950 with the aim to select table genotypes suited to cultivation in North Italy which were improvements on some existing table grape varieties, such as Bicane which is a female variety and Muscat Hamburg which has irregular ripening of berries inside the same bunch. Moreover, these crosses represent a reservoir of biodiversity which has not been fully characterised.

In this paper, we discuss agronomic and qualitative performances of some table grape Dalmasso crosses (ID) of potential interest for the cultivation in Piedmont region.

Experimental Procedure and Results

The data collection was carried out in a vineyard located at Chieri (Turin Province, 45°1'0"N 7°49'0"E, 350m a.s.l.). The vines, grafted onto Kober 5BB, were planted in 1975 (NW-SE row orientation with NE exposure) in a clay soil at a spacing of 2.0 × 1.0m and trained to the vertical shoot positioned system with arched cane pruning. Each variety or selection was planted in two plots with two plants in each plot. In 2013 agronomic features and qualitative parameters of grapes were evaluated. The different harvest period for each cross was identified according to the Pulliat's rank (I period: contemporary ripening with 'Chasselas dorée'; II p.: 15 days after I period; III p.: 15 days after II p.; IV p.: 15 days after III p.). The following genotypes have been evaluated: Teresita B. (Moscato d'Amburgo N.× [Bicane B. × (Regina B. × Terra Promessa B.)]), ID IV/60 N.(under parental SSR investigation), VI/6 B.(Bicane B. × Regina B.) and XI/20 N.(Moscato d'Amburgo N. × Regina B.).

The genotypes have been evaluated in terms of fruit characteristics and agronomic performance. Furthermore, we have evaluated the production quality through the assessment of technological maturity (total soluble solids, titratable acidity, pH), total anthocyanins and flavonoids (Di Stefano and Cravero, 1991), antioxidant activity (Re *et al.,* 1999) and varietal volatile compounds (Ferrandino *et al.,* 2012). Statistical analysis was carried out by the SPSS Statistics software (IBM).

Teresita (II/III period of harvest), is a white variety with medium vigour, low fertility in basal buds and a production of 8.75t/ha. In unfavourable years it has problems with low fruit-set. The berry is globose with medium skin firmness and muscat-like flavour with a predominance of linalool and geraniol (Figure1). During 2013 season, black ID IV/60 showed abundant production (47.50t.ha^{-1}), high Ravaz index (i.e. the yield to pruning weight ratio of 11.44) and high titratable acidity (9.34g.L^{-1} tartaric acid). It has big and attractive cluster with intense blue-violet globose berries (6.13g), with an amount of total skin anthocyanins of 479.40mg.kg^{-1} of berries. Furthermore, it showed a good resistance against downy mildew and grey mould. White ID VI/6 (II period) has good productivity (22.50t.ha^{-1}) with big, compact and attractive clusters (538.50g) and large globose or deformed berries (9.40g). Both its very high vigour with a low Ravaz index (2.20) and low basal bud fertility suggest that the adoption of expanse training system (e.g. pergola) with long pruning system is required. ID XI/20 was characterized by high yield (37.50t.ha^{-1}), big bunch (468.75g) and globose berries (6.84g) with low total skin anthocyanins content (152.76mg.kg^{-1} of berries).

In the 2013 season, all table grape genotypes produced good compositional characteristics, in particular their total soluble solids (TSS) were greater than the reference minimum value for table grapes (12° Brix, OIV 2010). Teresita reached the highest TSS content (21.20° Brix). ID IV/60 showed quite high levels of titratable acidity, an indication that growers should pay particular attention to canopy management with this selection. It also produced compact clusters requiring fruitlet removal after fruit-set to minimize problems in wet seasons. IV/60, VI/6 and XI/20 genotypes showed good resistance against *Plasmopora viticola* and *Botrytis cinerea*, suggesting a good adaptability in cool climate growing conditions like the Piedmont' areas. The highest antioxidant activity was found in the seeds (Table 1). This feature is very important, because it suggests that the seeds could be used in non-food industries, such as in cosmetics. The study of skin and pulp antioxidant activity is important for their human health implications. The results of antioxidant activity for these genotypes highlight the importance of all phenolic classes, not just colour in determining this activity (Table 1). In this regard, C6 compounds (especially hexanal, (Z)-3-hexenal, (E)-2-hexenal and hexanol) and Sesquiterpenes are very important in non-aromatic genotypes. Teresita, produced an interesting muscat-like flavour, related to the predominance of monoterpenes (Figure 1b). The monoterpene profiles indicate that ID VI/6 had a molecule belonging to the menthol-family (29%). ID IV/60 had detectable levels of (E)-geranylacetone as monoterpenes whereas (E)-geranylacetone dominated the XI/20 genotype.

Discussion and Significance of the Study

In Italy the main table regions are in the South, for climatic reasons. However, the results obtained in this study indicate strong potential to spread the growing of table grapes into North Italy, including the Piedmont' area. Furthermore, some Dalmasso crosses show significant improvement over their corresponding parents, e.g. VI/6 compared to Bicane does not show flower abnormality. Moreover, although the consumers (especially in Northern Europe) prefer seedless varieties, the Dalmasso crosses offer potential for Northern Italian regions because of their adaptability to cool climate growing conditions, ability to meet satisfactory quality standards, the interesting nutraceutical characteristics of berries and the bond between growing area and origins of the genotypes.

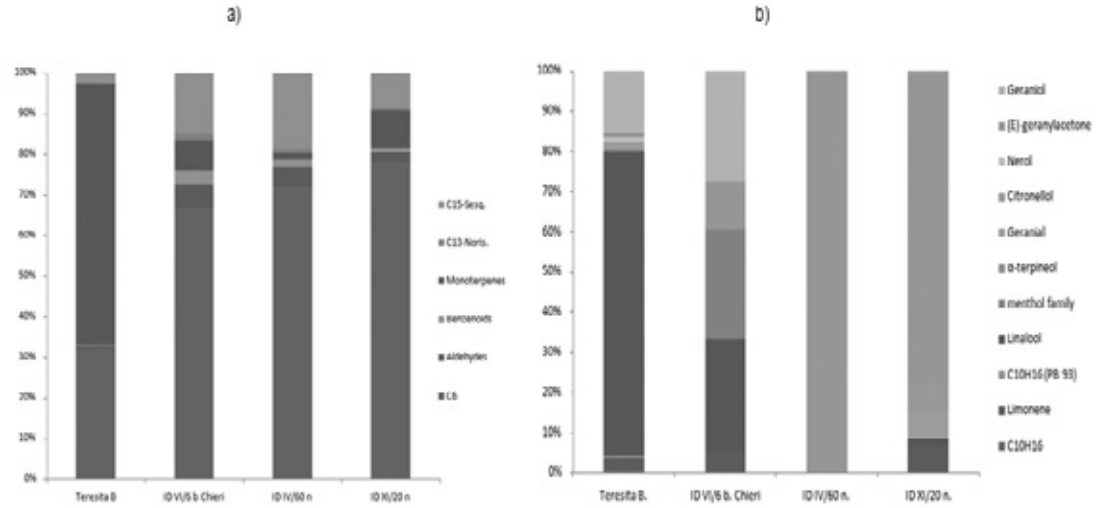

Figure 1. Free varietal volatiles profile (a) and monoterpenes profile (b) of table grape Dalmasso crosses (Stir Bar Sorptive Extraction technique).

Table1. Evaluation of antioxidant activity of skin, pulp and seeds of table grape Dalmasso crosses (ABTS radical cation decolourisation assay).

	Antioxidant activity (µmol Trolox g^{-1} fresh weight)					
	skin		pulp		seeds	
	average	± st err	average	± st err	average	± st err
Teresita B	235.38ab	4.51	0.46c	0.05	863.43b	45.26
ID IV/60 n	266.71a	49.63	2.20b	0.43	1088.23ab	121.61
ID VI/6b	143.55b	10.12	1.23c	0.22	1385.89a	104.06
ID XI/20 n	180.72ab	14.13	3.45a	0.11	1062.35ab	88.47
Test Tukey-b	a=0.05		a=0.05		a=0.05	

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