



Italy sweet revolution: how club grapes are transforming the table grape market

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Abstract. In 2023, Italy's table grape production covered approximately 47,334 hectares, yielding 7.9 million quintals. Apulia and Sicily are the main producing regions. Italy, the eighth largest global producer and leading European producer, exports around 45% of its grapes to Germany, France, Poland, and Spain, while meeting 98% of domestic demand. Traditional Italian grape varieties are seeded, but there has been a shift towards seedless varieties over the past decade due to consumer preference and their higher market prices. The study aims to evaluate the market value of key characteristics affecting table grape prices from 2016 to 2023 through a comparative analysis of average prices across seeded and seedless varieties, as well as club varieties protected by intellectual property rights (IPR) and those that are not. The statistical analysis of mean price differences for table grape was conducted using one-way ANOVA and Tukey's multiple comparisons test. Results show that seedless varieties, particularly those developed by breeders and protected by IPR, achieve significantly higher prices compared to seedle varieties. The introduction of club varieties has been significant in meeting the demand for high-quality seedless grapes. However, the profitability of these varieties depends on robust market demand, technical support from breeders, and favorable contractual terms. Policymakers can support local production by promoting PGI certification and enhancing farmers' collective bargaining power and access to plant genetic resources.

1. Introduction

In 2023, the Italian agricultural land harvested to table grape production was sized at approximatively 47.334 hectares, yielding 7.9 million quintals. The Apulia and Sicily regions are the primary Italian producing areas, with 25.075 and 18.795 hectares respectively [1]. Globally, according to the 2021 data from the International Organization of Vine and Wine (OIV) [2], Italy is the eighth largest producer of table grapes and the leading producer in Europe. Italian production is highly exportoriented, with approximately 45% of the product exported primarily to Germany, France, Poland, and Spain. The remaining portion serves the domestic market, meeting 98% of its demand, with the rest fulfilled by imports mainly from the Netherlands, France, and Germany.

The main Italian historical varieties are seeded ones such as Vittoria, Palieri, Italia, and Red Globe, while over the past ten years Italy has recorded an increasing number of hectares harvested with seedless varieties. Despite the increasing area dedicated to seedless varieties, the production still falls short of meeting domestic and European market demand. As a result of limited supply, seedless grapes are sold at higher average prices per kilogram than the more widely cultivated seeded varieties, reflecting the strong and growing consumer demand for such varieties.

In this market, farmers are investing more in planting seedless varieties, both in terms of dedicated hectares and the number of varieties, as found in survey interviews conducted among Italian supply chain experts (farmers, agronomists, and technical operators) [4]. There is also an increasing number of farmers who are planting seedless varieties protected by intellectual property rights (IPR) developed by breeders to match the growing demand for seedless grapes.

Thus, the aim of this work is to analyze the farm-gate prices in the Italian market supply for the three categories of table grapes: seeded, seedless varieties protected by intellectual property rights (IPR) and seedless varieties without IPR. This is achieved by analyzing the prices collected at farm-gate level from 2016 to 2023 for several table grape varieties belongingto the three categories. A statistical analysis of mean price differences for table grape was conducted using one-way ANOVA and Tukey's multiple comparisons test.

1.1. The Italian market of table grape seedless andfunctioning of club formula

The growing demand for seedless grapes has facilitated the introduction in the market of seedless varieties protected by intellectual property rights (IPR). Breeders, industrial companies that create new varieties, hold IPR for these varieties under the Agreement on Trade- Related Aspects of Intellectual Property Rights (TRIPs)promoted by the World Trade Organization or under thecommunity plant variety protection (CPVR). The latter, reformed in the early 1990s, extended protection to harvested materials (Article 14, paragraph 2), not just planting materials (e.g., seed or seedling), further stimulating genetic improvement programs in the fruit sector and economic exploitation. To cultivate and market IPR-protected grape varieties, farmers must enter into licensing agreements with the breeders. The agreement includes several clauses, such as the paymentof a percentage of sales – the so-called royalties – to thepatent owner, as well as a monetary amount at the time of planting and annually for the cultivation and sale of seedless varieties whose IPR are held by breeders [4-6].

Additionally, farmers are often subject to production standards defined by the breeder and imposed on the licensee, with an obligation to deliver the harvested product generating the so called "club varieties". Their supply chain encompasses breeders, nurserymen, farmers, growers' associations, and traders, that exclusively cultivate and market a single IPR-protected variety. Currently, the supply of horticultural products through clubs is already operational for several horticultural products. The most significant examples ofclub organization are found in the kiwi and apple supplychains, but the trend towards the use of protected varieties is growing in other sectors (e.g., nectarines, apricots, pears) [5]. Club model ensures a controlled and consistent quality of product, benefiting both consumers and producers. By focusing on IPR-protected varieties, clubs can maintain premium prices and reduce market competition. For instance, the adoption of club varieties in the table grape sector is helping Italian producers to meet the growing demand for high-quality seedless grapes. Additionally, this model allows for better management of supply chain, ensuring that the product meets specific standards and consumer preferences. The increased collaboration among different stakeholders in he club system also facilitates research and development, leading to innovations in cultivation techniques and postharvest handling for the benefit of the club as a whole. As a result, Italy is improving its competitive position in the international market for premium horticultural products by differentiating its products from those of other countries (e.g., North African ones) which focus on lowering the costs and prices of their products.

In the Italian table grape supply chain, the main breeders are: Special New Fruit Licensing Ltd. (S.N.F.L.), Sun World International LLC. (Sun World), A.V.I. S.r.l. (A.V.I.), International Fruit Genetics LLC. (I.F.G.), and Grapa Varieties Ltd. (Grapa). Protected seedless grape varieties, including breeders other than those mentioned above, occupy about 32% of the seedless grape-growing areas (approximately 14,000 hectares). Seedless club varieties cultivated in Italy find ample space on the shelves of national organized large-scale distribution, inaddition to being marketed in European markets. Production is mainly concentrated in Apulia and Basilicata, and to a lesser extent in Sicily [4].

2. Materials and methods

Data on farm-gate prices recorded in Italy between 2016 and 2023 for various seeded, seedless, and seedless club varieties, belonging to the main breeders operating in the Italian market (e.g., IFG, AVI, SNFL, SUN WORLD), are reported in Figure 1. The data show that the varieties protected by intellectual property rights and marketed by I.F.G., A.V.I., S.N.F.L., SUNWORLD recorded a higher average pricecompared to free seedless grapes between 2016 and 2023, ranging between $\pm 0.75/\text{Kg}$ to $\pm 1.35/\text{Kg}$ depending on the breeder's variety considered. These prices were higher than those recorded for free seedless varieties, whose prices ranged from $\pm 0.80/\text{Kg}$ to $\pm 1.05/\text{Kg}$, and always above those recorded for seeded varieties, whoseaverage price ranged from $\pm 0.52/\text{Kg}$ to $\pm 0.64/\text{Kg}$.

Figure 1. Average Price (€/Kg) recorded in Italy at farm-gate level for table grape varieties and breeders from 2016-2023.



Source: Our elaborations with own recorded data and ISMEA data [7]

Descripting statistics of data collected are reported in Table 1. The methodology for comparing mean prices across groups involves segmenting table grape varieties into seeded, seedless, club, and non-club categories, as well as by breeder origin. Average prices within each group are calculated over the 2016-2023 period. The statistical analysis of mean price differences for these table grape varieties (seeded, seedless with no IPR, and seedless under IPR) was conducted using one-way ANOVA and Tukey's multiple comparisons test. Values with the same letter are not significantly different at p<0.10, and all analyses were performed using STATA software version 17.0 [8-10].

Table 1. Statistics Description (Obs=224).

Variable	Mean	Std. dev.	Min	Max
Price	0.943	0.2519	0.3	1.5
Seeded	0.143	0.3507	0	1
Seedless no IPR	0.179	0.3839	0	1
Seedless with IPR	0.679	0.4680	0	1
A.V.I.	0.143	0.3507	0	1
S.N.F.L.	0.143	0.3507	0	1
SUN WORLD	0.143	0.3507	0	1
I.F.G.	0.250	0.4340	0	1

3. Results and discussion

Table 2 shows pricing trends and comparisons of table grapes, specifically comparing seeded, seedless (with and without intellectual property rights, or IPR), and different breeders from 2016 to 2023. The analysis reveals notable distinctions in pricing patterns based ongrape variety and breeder. Seedless grapes, both with and without IPR, consistently reach higher prices than their seeded counterparts. From 2016 to 2023, seeded grape prices remained relatively stable, fluctuating between $0.516\epsilon/Kg$ and $0.853\epsilon/Kg$. In contrast, seedless grapes without IPR experienced higher prices, averaging between $0.504\epsilon/Kg$ and $1.146\epsilon/Kg$ during this period. Seedless grapes under IPR exhibited the highest prices overall, reaching a peak of $1.234\epsilon/Kg$ in 2017 and remaining above $1.0\epsilon/Kg$ in several other years. This indicates a consumer preference

for the convenience and novelty of seedless grapes, especially those protected by IPR, likely due to their perceived higher quality or exclusivity. The results also highlight notable price differences among breeders. I.F.G. grapes consistently command the highest prices, peaking at 1.329€/Kg in 2017 and remaining strong at 1.214€/Kg in 2023. A.V.I.and S.N.F.L. have similar price trajectories, reaching their highest points in 2017 and showing some declines in subsequent years, although S.N.F.L. rebounded to 1.213€/Kg in 2023. S.U.N. WORLD, on the other hand, consistently has the lowest prices, dropping from 1.125€/Kg in 2017 to 0.838€/Kg in 2023. This suggests that both intellectual property protection and breeder reputation significantly influence the market value of table grapes, reflecting consumer preferences for innovation and quality. Results show that while seedless varieties generally reach higher farm-gate prices, the impact of breeders' involvement can significantly vary likely due to their ability to develop varieties which match the rising market demand for seedless table grape. Thus, a case-by-case evaluation of seedless varieties developed by breeders is needed, as these grape varieties do not automatically guarantee a higher market price than those freely available without IPR. Additionally, in some cases, the price premium of seedless varieties with IPR may not be high enough to cover the fees that farmers must pay to cultivate these IPR-protected varieties. Therefore, a cost-benefit evaluation is necessary before selecting the varieties to plant. Based on results, it is crucial to emphasize the importance of varietal renewal. This involves replacing the most widespread seeded varieties, such as Italia, with seedless varieties. Both those without IPR and those protected by IPR should be considered, as they are increasingly valued in the market. On the one hand, farmers can findclub varieties profitable under specific conditions. Firstly, there must be high market demand coupled withfarm-level premium prices that are sufficient to cover the costs of the fees required to grow IPRprotected varieties. Secondly, when breeders provide technical support-such as advice on cultivation techniques, recommendations for the timing and type of disease resistance treatments, and post-harvest handling plans-farmers can achieve productivity gains. Thirdly, and lastly, long-term contractual agreements with stable income and investment recovery potential can makeclub varieties attractive. On the other hand, high upfrontcosts without commensurate returns can render club varieties

Table 2. Farm-gate price (\notin/Kg) means comparisons across table categories and years.

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	Price 2016-2023		2016		2017		2018		2019		2020		2021		2022		2023	
Seeded	0.621	a	0.516	а	0.545	а	0.593	а	0.5702	а	0.606	а	0.636	a	0.647	а	0.853	a
Seedless no IPR	0.893	b	1.146	b	0.991	b	0.937	b	0.9562	b	0.823	b	0.753	b	0.504	b	1.036	b
Seedless with IPR	1.02	c	1.234	с	1.124	c	1.084	c	1.0711	b	0.992	с	0.897	c	0.687	а	1.105	c
Bredeer			2016		2017		2018		2019		2020		2021		2022		2023	
A.V.I.	1.016	а	1.200	а	1.138	b	1.038	b	1.038	b	1.013	b	0.925	b	0.700	b	1.075	b
S.N.F.L.	1.028	а	1.213	a	1.088	b	1.100	b	1.100	b	0.925	a	0.900	b	0.688	b	1.213	c
S.U.N. WORLD	0.848	b	1.125	а	0.963	а	0.900	а	0.900	а	0.875	а	0.713	а	0.475	а	0.838	a
I.F.G.	1.128	c	1.329	b	1.229	c	1.207	c	1.171	c	1.086	b	0.986	b	0.800	c	1.214	c

Values with the same letter are not significantly different at p<0.10.

unprofitable in the short term. This includes expensive licensing fees and low market demand. Additionally,

contractual restrictions that limit farming practices and create excessive dependency on the breeder and other supply chain actors can also hinder theprofitability of even the most productive IPR table grapevarieties.

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