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**Economic Commission for Europe**

Steering Committee on Trade Capacity and Standards

**Working Party on Agricultural Quality Standards****Specialized Section on Standardization  
of Fresh Fruit and Vegetables****Seventy-second session**

Geneva, 6–8 May 2024

Item 6 of the provisional agenda

**Review of existing standards****Study on implications of modifying the flesh colour  
uniformity provisions in the standard for kiwifruit****Submitted by the delegation of Italy***Summary*

At the 2023 session of the Working Party on Agricultural Quality Standards, the delegation of Italy expressed its concerns about the implications of modifying the flesh colour uniformity provisions in the standard for kiwifruit and informed of its intention to carry out a study with its industry to assess uniformity implications.

The Specialized Section is invited to provide comments.\*

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\* The study was received on 26 April 2024 and has not undergone formal editing by ECE.



*Ministero dell'agricoltura,  
della sovranità alimentare e delle foreste*

DIPARTIMENTO DELLE POLITICHE EUROPEE E INTERNAZIONALI E  
DELLO SVILUPPO RURALE

DIREZIONE GENERALE DELLE POLITICHE INTERNAZIONALI E  
DELL'UNIONE EUROPEA

PIUE V

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Subject: Seventy-second session of Specialized Section on Standardization of Fresh Fruit and Vegetables, Geneva, 6–8 May 2024 – Dossier from Italy on implication from revision of kiwifruit standard.

Following the commitment made at the last Working Party on Agricultural Quality Standards session, held in Geneva from 13 to 15 November 2023, the delegation of Italy presents a study, here attached, carried out with our industry, on the assessment of uniformity implications after amendment of the standard for kiwifruit.

Il Direttore dell'Ufficio PIUE V  
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*firmato digitalmente ai sensi del C.A.D.*

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# Italy's study on implications of modifying the flesh colour uniformity provisions in the UNECE standard for kiwifruit (FFV-46)

## INTRODUCTION

The kiwifruit is AN ancient fruit that was introduced into the market recently. It belongs to the *Actinidia* genus, that comprises around 54 species<sup>1</sup>. Only two of these are used in specialized cultivation for large-scale consumption: *Actinidia chinensis* var. *chinensis* e *Actinidia chinensis* var. *deliciosa*<sup>2</sup>.

Kiwi production is distributed worldwide in several Countries. Kiwifruit is grown in the Northern hemisphere, mainly in various Mediterranean countries (Italy, Turkey, Greece, France, Portugal and Spain) as well as in South Korea and Japan. In the Southern hemisphere, however, there are two important producing countries such as Chile and New Zealand, but small productions are also present in Argentina, Uruguay, Brazil, Australia and South Africa. Outside the list is China, the world's leading producer, where there are many varieties and production exceeds 2 million tonnes<sup>3</sup>.

<b>MAIN KIWI PRODUCING COUNTRIES – year 2022</b> (source: FAOSTAT)		
<i>Country</i>	<i>Production quantity</i>	<i>Area harvested</i>
<b>China</b>	<b>2.380.304 ton</b>	<b>199.078 ha</b>
<b>New Zealand</b>	<b>603.523 ton</b>	<b>14.686 ha</b>
<b>Italy</b>	<b>523.120 ton</b>	<b>24.040 ha</b>
<b>Greece</b>	<b>320.270 ton</b>	<b>13.560 ha</b>
<b>Iran</b>	<b>294.571 ton</b>	<b>9.910 ha</b>
<b>Chile</b>	<b>114.533 ton</b>	<b>6.638 ha</b>
<b>Turkey</b>	<b>100.772 ton</b>	<b>4.219 ha</b>
<b>Portugal</b>	<b>52.920 ton</b>	<b>3.520 ha</b>
<b>France</b>	<b>47.120 ton</b>	<b>3.930 ha</b>
<b>USA</b>	<b>33.110 ton</b>	<b>1.943 ha</b>

Italy is among the main kiwifruit producing countries in the world, with a 2022 production of around 500.000 tonnes.

Italy has rapidly become competitive on the international market by adapting kiwi cultivation to large areas previously intended for vines cultivation. Since 1970, kiwi production has increased year by year, reaching a production of around 300.000 tonnes near the end of the 1980s and exceeding 400.000 tonnes in the first decade of 2000s. Regarding production, Italy represents 70%

<sup>1</sup> Zhang X. – Bao W. – Zhang A. – Pathirana R. – Wang Q.C. – Liu Z.E., “Cryopreservation of shoot tips, evaluations of vegetative growth, and assessments of genetic and epigenetic changes in cryo-derived plants of *Actinidia* spp” in *Cryobiology International Journal of Low Temperature Biology and Medicine* Volume 94, Elsevier, June 2020, 18 – 25.

<sup>2</sup> Mian G. – Iseppi L. – Traversari G. – Ermacora P. – Cipriani G. – Nassivera F., “Consumers Perceptions and Motivations in the Choice of Kiwifruits: A Study-Case in Italy, North-East” in *Quality – Access to Success Journal of Management Systems* n.23, Romanian Society for Quality Assurance, 2022, 163 – 175.

<sup>3</sup> FAOSTAT Crops and livestock products (*World, production quantity, kiwi fruit, 2022*)

of kiwi harvested in the Northern hemisphere, excluding China. The most productive areas are the southern Lazio, with the only province of Latina representing over 30% of the entire national production, Piedmont which represents around 17%, Emilia-Romagna, around 15% of production, and finally Calabria (11%) and Veneto (10%).

The opposite harvest season of the product, compared to New Zealand, has made Italy the second exporting country, with about 75% of production directed abroad. The main destination countries are Germany (about 15% of total exports), Spain (11%), France (9%), the United States (7%) and Poland (5%). Finally, it is worth mentioning the constant growth of organic kiwifruit crops, whose surface area has increased by 30% in the last five years, with just over 7.000 hectares on a total of 24.000.

## GLOBAL CURRENT OVERVIEW

The global kiwifruit market is worth about 7 billion of U.S. dollars per year and is facing a fast-changing dynamic. European markets are mature and stable for this product: demand is high as kiwifruit is a fruit loved by consumers. Over the next five years, sales are estimated to increase at a compound annual growth rate of around 6%.

As a result, in addition to European production, a significant share of the supply is covered by imports from outside the EU.

In the last year, due to adverse weather conditions, the main European producing countries have recorded declining volumes. In fact, the total estimated production in the current European campaign will be about 755.000 tons, 4% less than in 2022 and well below 800.000 tons. registered in 2018/19.

In this scenario, Italy has estimated production by almost 40% less, because of the drought and the persistent plant diseases that afflict this crop. The forecast is -15% for the green kiwi alone.

Greece is expected to maintain last year's production, with a non-significant drop of -3%. The trend is also negative in Spain, where volumes are expected to decrease by -4%, stopping at just over 28.000 tons. France's production forecast is around 46.000 tons (+2% compared to 2022) while Portugal is expected to increase by 10%, up to 58.000 tons.

Greece, Europe's second largest producer of kiwifruit, is on the rise, thanks to increasing production that allows it to be dynamic in exports. In this regard, it should be noted that the Greek kiwifruit is conquering not only the European market, where it makes up for the shortage of Italian and New Zealand kiwifruits, but also large markets such as India. Good quality and low prices compared to competitors are the country strengths.

France, Europe's fourth largest producer, has not suffered any negative effects, but its production has numbers that allow it to satisfy mainly the domestic market.

Outside Europe, kiwifruit production is struggling in the two main exporting countries of the southern hemisphere: New Zealand and Chile.

In the South American country, production was lower than the previous year (-11%) reaching just under 125.000 tons, with very high prices at origin. New Zealand also had a lower-than-expected

harvest (-21%), with only 492.000 tons produced, with high drop in production for the yellow kiwifruit. The scarce presence of New Zealand kiwifruit on the market has favoured countries such as South Africa, whose yellow kiwifruit crop has been entirely destined for export, finding a place in the seasonal substitution phase between European and New Zealand yellow kiwifruit campaign.

North America remains an important market, with imports volumes from New Zealand and Chile remaining stable despite adversity.

## CURRENT SITUATION IN ITALY

Kiwifruit cultivation developed and highly specialized in Italy since the 70s, reaching numbers that place it in first place in Europe for areas under cultivation and in second place globally, behind China<sup>4</sup>. Although actinidietae acreage remained stable over the past five years, production yields have fluctuated significantly. In fact, compared with New Zealand, production output per hectare is quite half in Italy. The reason for this production gap is rooted in several cause, such as the different pedoclimatic and agronomic conditions in the two countries, the different production techniques, the spread of known and new diseases, which are significantly influencing the cultivation of kiwifruit in Italy.

If in the early 2000s Italian growers had to deal with various pathogens such as kiwi bacteriosis, due to the presence of the bacterium *Pseudomonas Syringae actinidiensis* and the aggression to the crops of different regions from the so-called *Asian stink bug pest* (Brown marmorated stink bug), the main cause of the constant decline in production in the recent years is due to the *Kiwi Vine Decline Syndrome* (known in Italy as "Moria del Kiwi"), a plant disease that has reduced plantations, especially in the north of the country. *Moria* appeared in northern Italy about ten years ago and is estimated to have affected about 8.600 hectares since then.

The action of this syndrome on kiwi leads to a rapid deterioration of the plants, which are no longer able to renew themselves and to issue new shoots, initially manifesting evident leaf desiccation of the foliage which then continues throughout the plant until it leads to the total desiccation of the plant. The roots of the affected plants are reddish in colour, characterized by thickenings reminiscent of a rat's tail. *KVDS* expands rapidly in the orchard and within few years causes the complete die-off of the grove. This syndrome initially appeared in Italy, has spread also with different forms all over the world<sup>5</sup>.

In 2020, *Moria* caused 300 million of euro in damage<sup>6</sup>. The pathology manifested itself more clearly in areas with by poorly draining soils<sup>7</sup>, where submersion irrigation was carried out, or in

<sup>4</sup> FAOSTAT, Crops and livestock products (*World, Area harvested, kiwi fruit, 2018 - 2022*)

<sup>5</sup> Tacconi G. – Tosi L. – Giacomini A. – Nari L. – Berra L. – Spadaro D. – Prencipe S. – Rosati M. – Savian F. – Saro S. et al., "La moria del kiwi al 2020: Lungi dalla soluzione!" in *Kiwi Informa* numero 16 fasc. 4-6, Arma - Borgo Bainsizza 2020, 6–17.

Tacconi G. – Paltrinieri S. – Mejia J.F. – Fuentealba S.P. – Bertaccini A. – Tosi, L. – Giacomini A. – Mazzucchi U. – Favaron F. – Sella L. et al., "Vine decline in kiwifruit: Climate change and effect on waterlogging and Phytophthora in North Italy" in *ISHS Acta Horticulturae 1096*, Hongwen Huang, 2015, 93 – 97.

<sup>6</sup> "La moria del kiwi al 2020: Lungi..." (cit.)

<sup>7</sup> Savian F. – Ginaldi F. – Musetti R. – Sandrin N. – Tarquini G. – Pagliari L. – Firrao G. – Martini M. – Ermacora P., "Studies on the aetiology of kiwifruit decline: Interaction between soil-borne pathogens and waterlogging" in *Plant and Soil*, Volume 456, Issue 1-2, Springer, November 2020, 113–128.

productive areas characterized by heavy rainfall that left the soils in anaerobic conditions for long periods<sup>8</sup>.

The last season recorded a production of only 311.000 tons and estimates for the 2024 campaign foresee a further reduction of -15%. Just five years ago, Italy produced about 373.000 tons. of kiwifruit, of which 60.000 tons. of yellow-fleshed varieties.

In fact, by some estimates<sup>9</sup>, in this campaign Greece will reach Italy's level in terms of production despite the fact that the country has a much higher potential (about 500 thousand tons) which has failed to be achieved for several years due to a combination of adverse weather events – late spring frosts and heavy summer heat – and the phytosanitary problems already mentioned, such as *Moria*, which mainly concerned the most common green variety, *Hayward*.

In addition to plant diseases, new consumer trends are also influencing Italian production choice, with new and more refined varieties.

Plant diseases have affected the yellow-fleshed varieties crops to a lesser degree. In fact, this production, thanks to the new plantings that are coming into full production, is in a positive trend.

If only five years ago the areas planted with green-fleshed kiwifruit were about 22.000 hectares, in 2023 they decreased to just under 18.000 while those destined for yellow kiwifruit increased from 5.000 hectares in 2019 to 6.000 in 2023<sup>10</sup>, with an expected production of about 100.000 tons, up 12% compared to the previous year. The plantation areas of "red" kiwi are also growing and have reached about 400 hectares compared to a few dozen only few years ago.

## EXPORT

The enormous potential of the kiwi has been widely exploited by New Zealand which, starting from the second half of the 20th century, developed crops and begun to sell the fruit in markets where it was totally unknown, renaming the "Chinese gooseberry" with the name of the characteristic national bird. Today, New Zealand is the leading exporting country of kiwifruit, thanks also to the unification in 1989 of all the producers into a single commercial entity owned by the growers themselves which, in monopoly, manages exports and successfully carries out research for the improvement of kiwifruit selection and cultivation.

Due to the seasonal cycles in the opposite hemispheres, New Zealand does not harvest fruit from November to May, a period in which a large part of the supply is covered by Italian production.

Regarding export, the last season was positive for Italy, with a volume that rose from about 270.000 tons in 2022 to over 300.000 in 2023, and an increase in value of about 24% (about 500 million euros in 2022 and over 600 million in 2023)<sup>11</sup>.

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<sup>8</sup> D'Ippolito I. – Mang S.M. – Elshafie H.S. – Camele I. – Scillitani G. – Mastrodonato M. - Sofo A. – Mininni A.N. – Xylogiannis E., "Morpho-Anatomical and microbiological analysis of kiwifruit roots with KVDS symptoms" in *ISHS Acta Horticulturae 1332*, Hongwen Huang, 2022, 131–136.

<sup>9</sup> 42<sup>nd</sup> International Kiwifruit Organization conference, Curicò (Chile), 12-14/09/2023.

<sup>10</sup> CSO Italy, total kiwi areas by variety.

<sup>11</sup> Elaboration of Fruitimprese from ISTAT data, <https://www.freshpointmagazine.it/produzione-mercati/export/lexport-di-ortofrutta-in-crescita-del-91-nel-2023/>

The positive trend mainly concerns yellow- and red-fleshed kiwifruits, which mark on total exports, respectively, +12% and +50%.

<b>Trade balance fresh kiwifruit – ITALY</b> <small>(source: ISTAT)</small>					
IN VALUE (in thousands of €)					
	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
EXPORT	444.036 €	450.049 €	463.547 €	474.633 €	509.946 €
IMPORT	95.065 €	78.964 €	92.152 €	126.628 €	136.446 €
FINAL BALANCE	365.072 €	357.897 €	336.919 €	338.187 €	390.204 €
IN VOLUME (in tonnes)					
	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
EXPORT	293.262	312.490	275.982	269.318	282.219
IMPORT	51.032	66.392	74.156	85.630	70.603
FINAL BALANCE	242.231	246.098	201.827	183.688	211.616

## VARIETIES ON THE MARKET

The most recognizable characteristic of the kiwifruit is its hairy surface, consisting of short, brown hairs which are not edible. The fruits are oblong with a length ranging from about 4 to 9 cm. Depending on the variety, the fruit flesh may be green, yellow (gold), with a white center. The black seeds are commonly eaten along with the pulp since they are very small. The most common variety of kiwifruit is the green *Hayward* variety, which accounts for nearly 90 percent of world production.

Other varieties are experiencing growth in recent years. Especially the yellow or "gold" kiwi, which take its name from the mustard-yellow colour of the flesh and is appreciated for have a less acidic and more tropical flavour, halfway between a mango and a strawberry, or even a banana. Same flavour has the new "red" kiwi varieties, with a yellow/green exocarp and red endocarp, preferred for its distinctive sweetness, due to the high sugar content, and the creamy texture of the pulp.

Among the new varieties it should be mentioned the *hardy*, *arguta*, "mini kiwi", "baby kiwi", which are smaller than the conventional kiwis, with dimensions like those of a grape. They can resist to cold temperatures and do not have the furry exterior, that allows to consume them entirely. The *Kolomikta* variety, also known as "arctic kiwifruit", is very resistant to cold as well. It's hair-free too and has ten times more vitamin-C content than the *Hayward*.

## PRICES

The differences between green and yellow kiwifruit are not only in taste and pulp colour, but – above all – they have very different prices.

The Italian market offers the national product from late autumn to late spring. In the summer months, at the end of the campaign, the supply is ensured with the import of foreign products, mainly from New Zealand and Chile. Therefore, the seasonal alternation in the hemispheres allows the two main kiwifruit exporting countries, Italy and New Zealand, to cover the world's demand all year round.

Following the historical trend, there is an average drop in prices in the winter months, in the middle of the campaign, with a rise in the last months at the end of the Italian harvest period. All these factors make it possible to maintain an almost stable price of green-fleshed kiwifruit. In the 2011/2012 harvest season the average price at origin was €0.95/kg with an average retail price of €1.75/kg for green kiwifruit/*Hayward*<sup>12</sup>.

In 2023, the average price at origin was €1.49/kg for the *Hayward* variety with wholesale prices averaging €2.30/kg.

In 2023, the average price at origin was €2.63/kg for “gold/yellow” varieties, with wholesale prices averaging €5.30/kg<sup>13</sup>.

For other special varieties of kiwifruit (red-fleshed pulp, baby kiwi, etc.) the average price is 8-10€/kg.

## CONCLUSIONS

Besides the two varieties covered by the UNECE standard, the genus *Actinidia* includes more than 60 varieties used for trans-specific hybridization to obtain new commercial products.

Among the yellow-fleshed varieties, there are *Jintao* (derived from *Chinensis*), *Jinyang* (a cross between *Actinidia Eriantha* and *Actinidia Chinensis*), “golden kiwi” (from *Actinidia deliciosa*), “Arnold” (whose species is unknown) and *Jinfeng* (whose species is unknown).

In addition, the varietal selection is in great evolution with *cultivars* and hybrids derived from other species such as the “red kiwi” (from *Actinidia Melanandra*) “Dong-hong” and the “vitikiwi” (from *Actinidia Arguta*).

The big changes underway and, especially, the heavy climatic adversities and plant diseases that Italian kiwifruit producers have had to face in recent years, are leading to a profound change in the sector. The long experience gained over decades of green kiwifruit cultivation pushed many companies to convert production to new varieties which, although still representing a niche in the vast fruit and vegetable market, have high agronomic potential and brilliant market outlook.

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<sup>12</sup> ISMEA, Il mercato del kiwi, 23/07/2013 (from Ismea website: [www.ismeamercati.it](http://www.ismeamercati.it))

<sup>13</sup> Data come from monthly surveys of ISMEA and Unioncamere-Ministero delle Imprese in the main wholesale marketplaces.



The weak or non-existent competition from other countries and the better remuneration, that the new varieties with non-green pulp guarantee to producers, are the two main factors of this trend inversion in Italy, which remains the main producer and exporter in the Northern hemisphere.

Considering the above, the new possibility of marketing kiwifruit with a different pulp colour in the same package involves, in our opinion, critical issues.

First, mixed packaging can confuse the average consumer about the quality of the product in. Combining the conventional and widespread green kiwi with products that are different in terms of organoleptic characteristics, ripening and conservation, could lead to a risk of losing the peculiarities of the new varieties, limiting the consumer's choice and nullifying the perception that the new products deserve, especially in light of the varieties of kiwifruit that are still marginal in the market and difficult to identify.

In addition, a packaging of kiwis with different flesh colour creates further misperception about the value of the fruit. As previously described, the new varieties are up to three times more expensive than conventional green kiwifruit. The sale of products with very different prices in the same package brings the consumer to feel the new varieties as the same as the more popular ones.

Moreover, companies could offer mixed packs with very different prices, based on the presence – in percentage – of the most expensive varieties. Therefore, the consumer may find a mixture of kiwifruit on the market that is cheaper than another, simply because the amount of green kiwifruit is higher than that of another producer. This is an assumption of unfair competition, the implications of which cannot yet be assessed in practice.

Finally, fruits with enormous differences in sugar content, ripeness and size involves difficulties for carry out quality controls, with consequences on the effectiveness of the inspection activities for the competent authorities.

All these factors increase the risk that the new standard on uniformity could have negative effects on the kiwifruit market for producers and consumers.