ducer to consider this factor when selecting cultivars to grow. Tolerant cultivars may have a distinct advantage in growing regions where 2,4-D spray drift is a frequent hazard.

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Current Trends in Stone Fruit Growing in Europe

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In assessing stone fruit growing trends in Europe, it is necessary to distinguish between acreage and production. According to the official 1977-1982 EEC survey, the combined acreage of peach, apricot, plum and prunes for the 12-member Community exceeds 310,000 hectares. This figure excludes cherries, for which no data were available in that period. Up to 1982 there was a decrease in total area amounting to 7,000 hectares, although there were marked differences from country to country (Table 1). In the four-years since 1982, that trend has reversed itself, with acreage, especially peach, increasing by more than 20 thousand hectares.

By contrast, over the same period and for the same species, production rose from 3.8 to 4.7 million metric tonnes. This upturn is conspicuously linked to orchard renewal and improved efficiency, especially in the southern countries where new plantings tend to be larger than the old and yield per hectare is relatively higher (Tables 1 and 2, Fig. 1) This situation has also clearly been influenced, at least as far as France and Italy are concerned, by the EEC's economic policy and various market regulatory measures and by farm and market restructuring initiatives implemented by individual countries acting at times unilaterally.

Let me just mention one of the consequences of these actions as an example. The peach is the main species to benefit currently from EEC price support subsidies. From 1981 to 1985, market withdraws of peaches from the 10-member Community amounted to 250-300 thousand tonnes yearly. With the exception of 1976, this figure is higher than the total for the preceding 15 years.

The relationship between supply and demand has been affected. Although better organised and seasonally distributed and of better quality, peach and prune supplies are already at surplus levels, while demand is essen-

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Table 1. EEC Stone Fruit Orchard Acreage (000 Ha).

	Peach & Nectarine			Apricot			Cherry	Plum & Prune		
	'77 (78)	'82	'84 (85)	'77 (78)	'82	'84 (85)	'84 (85)	'77 (78)	'82	'84 (85)
France	39	36	37	15	13	14	18	20	19	19
W. Germany	0.3	0.1	0.1	0.1	0.1	0.1	10	4	4	4
Greece	32	25	31	5	7	7	5	1	1	1
Italy	80	85	88	10	10	16	24	8	9	13
Spain	48	46	57	23	20	21	18	12	17	17
Portugal	8	8	8	2	2	2	4	2	2	2
U.K.	—	—	—	—	—	—	1	5	4	3
Benelux e DK	—	—	—	—	—	—	3	2	1	1
Total	207	200	221	55	52	60	83	54	57	60

Source: FAO-EUROSTAT.

tially stagnant, or slightly up at best.

From 1978 to 1983, consumption increased substantially. The OECD peach demand outlook over the ten years from 1978 to 1988 foresees a 20% increment in Italy but a much less consistent one, or possibly even a decline, in France and West Germany.

Peach

1) *Production.* Beginning in 1976, the first year of large surplus yield within the EEC, peach acreage gradually declined—with Italy being the only exception—until four years ago when further expansion everywhere became the trend (Table 4). In the last decade, yield has grown 30% in Italy and an average of 10-15% in France, Greece and Spain. Thus the situation is again one of surplus which can be defined as chronic or structural, given the permanent EEC supports without limit on quantities.

The four leading peach producers, France, Greece, Italy and Spain, approached the 3 million tonne mark in 1985 as against the 850 thousand tonnes of the other European and Mediterranean countries (Table 4). In these

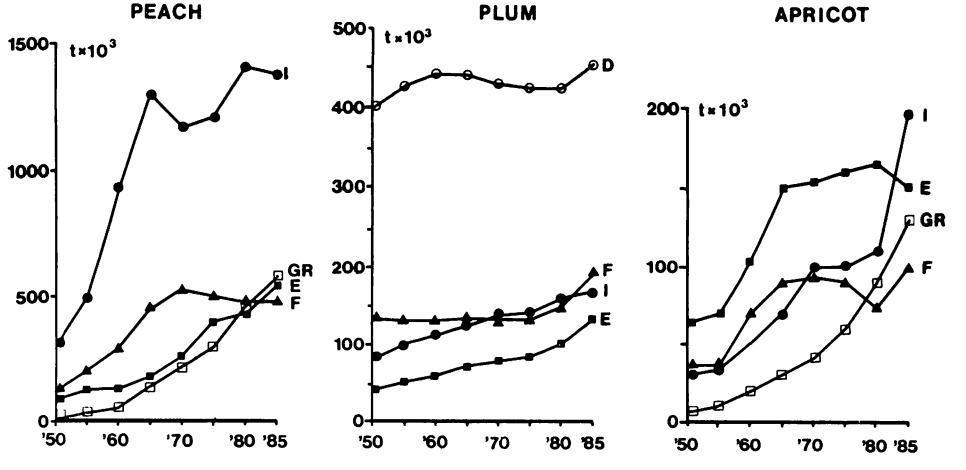

Figure 1. Trend of peach, plum and apricot production from 1950 to 1985 in the main european countries: Spain (E), France (F), Greece (GR) and Italy (I).

Table 2. Stone Fruit Production in Europe (000 T/yr).

	Peach & Nectarine			Apricot			Cherry		Plum & Prune		
	74-78	79-83	84-85	74-78	79-83	84-85	79-83	84-85	74-78	79-83	84-85
France	400	456	486	79	75	90	103	110	19	158	208
W. Germany	22	23	24	2	2	2	220	260	379	429	451
Greece	348	411	549	73	98	113	26	35	16	6	5
Italy	1244	1493	1487	94	132	197	135	158	146	165	163
Spain	361	442	519	169	157	180	76	77	79	105	128
Other (*)	431	404	415	180	176	185	590	650	2120	2239	1833
Total	2806	3229	3480	597	640	767	1150	1290	2759	3102	2788

Source: FAO-EUROSTAT.
(*) All other European countries excluding USSR.
T = metric tonnes.

same four countries, the increase is mainly due to nectarines, which have been added to and, at times, even replaced yellow and white peach output in such areas as northern Italy and the Gard in France. Nectarines, with a 380 thousand tonne yield in 1985, continue to rise in production, and their more than 50 varieties, which rival those of peach, are marketed throughout the season.

Peaches, on the other hand, are now almost all yellow-flesh varieties, except in France where white cultivars still hold their own and account for 20-30% of new orchards. Canning peach output is also on the rise with the clingstone cultivars, although it is a well known fact that Spain, Greece and southern Italy mainly grow them for the fresh market. The processing industry accounts for an average 10-15% of total peach output yearly, not just clingstone, since juices and jams are also produced from yellow peaches. In Italy and France the processing industry accounts for no more than 5-7% of production.

There are problems, however, in the processing industry as well. For example, without a 1-franc per kg subsidy (228 Ital. Lire/kg), the canned peach sector would have had to cut back production. And, while there are still no restrictions in the quantities being processed, it is widely held that the EEC, faced also with continuing pressure from extra-European competitors, will progressively reduce price supports along the lines of the cautious rollback imposed in 1986.

2) *Varieties.* Table 5 gives an acreage breakdown of the Italian and French peach cultivars of the last 5 years. These cultivars are, coincidentally, also the most important within the EEC. It will be seen that certain trends, such as the introduction of U.S. peaches, are common to both countries, while local cultivars, like white-flesh peaches and clings, con-

Table 3. Estimated Per-Capita Consumption (kg/year) in 1983.

Country	Peach	Apricot	Plum-Prune	Total
France	4.5	1.4	2.5	8.4
Germany	3.5	0.9	6.0	10.4
Greece	16.0	4.5	0.5	21.0
Italy	14.5	3.0	2.0	19.5
Spain	9.5	3.0	2.0	14.5

Source: OECD.

Table 4. Peach and Nectarines Production (000 T. 1985) in the Main European Countries.

	Peach			
	Freestone	Clingstone	Nectarine	Total
France	365.0	34.4	89.4	488.8*
Greece	260.0	220.0	29.0	509.0
Italy	951.7	222.0	233.9	1,419.5
Spain	212.0*	292.0*	26.5	530.9
	1,788.7	768.4	378.8	2,947.8

Other European and Mediterranean countries: Turchia 230; Bulgaria 120; Yugoslavia 92; Romania 60; Ungheria 90; Germania Fed. 33; Israele 24; Portogallo 31; Algeria 30; Tunisia 27; Siria 25; Marocco 23; Egitto 10; Libano 22; Cecoslovacchia 16, Austria 14, ecc.
*Estimated data.

tinue to be important in certain market sectors.

The data show also the certain old yellow cultivars like 'June Gold,' 'Elberta' (in Greece), 'Redhaven' and its sports, 'Suncrest,' 'Dixired,' and 'N. H. Hale' are planted much less than before. Especially early-ripening cultivars, that mature in June like 'Springcrest,' have been introduced recently in the more southern growing areas where climate is more conducive and plastic covering may be used at winter's end and spring to hasten ripening by 15-20 days. Another expanding group is that of the medium-late ripeners which reach maturity in August, and include peaches like 'O'Henry' and, particularly, nectarines. It is noteworthy that nectarines, which became widespread only in the 1970's, are already undergoing orchard renewal. While certain cultivars like 'Early Sun Grand' and 'Stark Red Gold' are being retained, other first-generation ones such as 'Nectared,' 'Red June,' 'Crimson Gold,' 'Independence,' 'Flavortop,' 'Fantasia' and late-ripeners 'Flamekist' and 'Fairlane' are being replaced mainly by new American varieties. In Italy, new cultivars obtained through breeding programs in the last 15 years now account for 10% and more of new orchards.

Of greatest interest to Europe among the new yellow cultivars are 'May Crest,' such earlier-ripening sports of 'Springcrest' as 'Earlycrest' and 'Starcrest,' 'Goldencrest,' 'Springlady,' 'Flavorcrest' and some Merrill selections such as 'July Lady,' 'Lizbeth,' 'Early O'Henry,' 'O'Henry' and so forth; among the white peaches 'Maria Bianca,' 'Mireille' and 'Primerose'; among the nectarines: 'Super Crimson,' 'Springred,' the Diamond selections, 'Firebrite' and the Italian cultivars 'Maria Emilia,' 'Weinberger,' 'Nectagrand 4,' 'Maria Laura,' 'Maria Aurelia' and 'Claudia;' among the white nectarines: 'Snow Queen,' 'Fuzalode' and 'Jacquotte'; and among the clingstones the American: 'Andross,' 'Loadel,' 'Vivian' and 'Babygold 6,' the early-ripening French 'Frederica' and the Italian 'Maria Serena,' 'Adriatica' and 'Tebana.'

Tables 6 and 7 show the distribution of CTIFL-certified nursery budwoods in France during 1985-86, for a total of over 1 million buddings and graftings. These data are contrasted with the results from a direct cultivar survey in Italy of four important nurseries in the Emilia-Romagna which marketed an average of 600 thousand peach trees yearly from 1983 to 1985. The findings reveal a marked preference, in the order of 20%, for certain new cultivars. Mainly from the U.S., they had been previously tested and approved by competent public-sector authorities such as research centres, university institutes and extension services in Italy and France.

Table 5. Peach Cultivar and Acreage Breakdown in France and Italy (1981-84).

	Italy		France		
	1982 %	Trend	1981 %	1984 %	Trend
Yellow Peaches	**62.9**		**53.5**	**47.8**	
Armgold	1.7	——	—	—	
Cardinal	3.3	——	2.0	1.0	——
Coronet	1.3	=	—	—	=
Cresthaven	3.1	-	—	—	=
Dixired	4.5	-	5.5	4.0	-
Early Redhaven	—	+	1.8	2.0	+
Fairhaven	0.4	-	1.8	0.7	——
Franciscan	0.2	-	2.8	2.4	-
Gemfree	—	=	2.2	1.5	——
Glohaven	3.4	-	—	—	=
Hale J.H.	3.7	-	1.1	—	——
July Lady	—	+	1.3	1.6	+
O'Henry	—	+	1.1	—	——
Redhaven	11.6	——	7.4	5.4	-
Red Top	1.4	-	2.4	2.6	+
Southland	1.5	——	0.9	-	-
Springcrest	—	+++	4.9	5.5	+
Suncrest	6.6	++	2.4	2.1	+
Other	21.9	+	15.9	19.0	+
White Peaches	**11.8**		**21.0**	**21.6**	
Michelini	1.4	-	3.1	2.6	-
Pieri 81	1.0	=	—	—	
Red Robin	—		1.2	1.9	+
Redwing	—		3.5	4.4	++
Robin	—		1.8	1.9	+
Springtime	1.8	+	4.4	3.5	——
Other	7.6	=	7.0	7.3	=
Nectarines	**12.4**		**17.8**	**22.6**	
Early Season	3.6				
—Armking		++	1.7	2.6	++
—Crimson Gold		-	1.7	1.5	-
—Nectared 4		——	1.0	0.8	-
—Red June		-	0.9	0.7	-
—Other		+++	3.2		
Mid Season	6.9				
—Early Sungrand		+	1.2	1.5	+
—Flavortop		-	-	—	
—Independence		=	-	0.9	++
—Other		+++	3.1		
Late Season	1.9				
—Fantasia		=	1.8	2.8	++
—Stark Red Gold		++	-	-	
—Other (Fairlane, etc.)		+++	3.1	11.8	+
Cling	**12.9**	++	**7.7**	**8.0**	=

Trend = - reduction; + increase.

Table 6. Peach Cultivars: Up-Dated Nursery Trend.

Yellow Peaches	Italy Avg. 83-85 % (1)	France 1985 % (2)	White Peaches	Italy Avg. 83-85 % (1)	France 1985 % (2)
Dixired	0.3	3.6	Genadix 4	—	1.6
Early Crest	0.7	—	Iris Rosso	0.4	—
Early Redhaven	—	1.9	Impero	—	0.8
Fayette	2.1	1.4	Maria Bianca	1.3	—
Flavorcrest	2.4	6.3	Michelini	—	1.3
Golden Crest	1.7	—	Mireille	—	2.3
June Gold	1.0	—	Primerose	—	2.9
Maycrest	6.9	5.6	Redwing	—	5.4
Redhaven	0.7	1.5	Robin	—	0.6
Red Top	0.7	3.2	Springtime	0.3	0.8
Rubired	1.0	—	Other	0.3	5.7
Springcrest	4.0	2.9	Total %	2.3	21.4
Suncrest	1.7	—	**Cling**		
Merrill Group (3)	2.9	4.7	Andross	2.5	1.0
New Italian cvs. (4)	0.7	—	Babygold 9	1.8	0.9
			Frederica	0.1	1.2
			Vivian	0.4	0.6
Other	1.2	6.5	Other	8.4	1.5
Total %	37.0	37.6	Total %	13.2	5.2

(1) Percentage of scion and budded trees sold yearly (1983-85) by four Italian nurseries.
(2) Percentage of certified bud and scion woods distributed by CTIFL in France.
(3) Gem Free, Spring Lady, Lizbeth, June Lady, July Lady, Elegant Lady, Early O'Henry, O'Henry, etc.
(4) Rosired 1 and 3, Springbelle, Maria Luisa, Flamin;ia, etc.

It is now generally held that peach tree demand is slackening and the rate of new orchards will diminish in the next few years. There have also been calls for a drastic scaling-back of the existing peach orchards. With 10% of peach orchards being 15 years or older, such a programme could conceiveably be implemented by an early cutting down of the oldest and least productive and remunerative orchards, especially in areas only marginally suited to peach growing. Seen from this vantage, the EEC market supports represent an impediment to the renewal of the peach growing industry.

Ripening dates are also a source of certain yield imbalances. The major surplus still comes during the traditional mid-July-to-mid-August ripening period but there are signs of overproduction at times even in late June. Another factor of contention is that market quality standards and field characteristics of the many cultivars are not constant over the 4-month growing season. This results in having to cover certain periods, for example from 'Dixired' to 'Redhaven,' for which replacement cultivars of the established quality do not exist, There is, then, an uneven yield distribution throughout the season which also contributes to surplus production.

3) *Rootstocks.* Up to and including the present, peach seedlings have been the main rootstocks. Some selections of these were commercially spread, GF 305 and Higama (too expensive), Montclar, Siberian and Harrow blood. Neaguard (with poor results); recently Rubira and Rutgers Red Leaf and the promising Italian selections B/2 and A/5 (uniform and less vigorous).

In fertile, fresh and deep soils with good drainage, peach seedlings are still preferred. In the last 10-15 years, some clonal rootstocks have increased

Table 7. Peach Cultivars: Up-Dated Nursery Trend.

Yellow Nectarines	Italy Avg. 83-85 % (1)	France 1985 % (2)	White Nectarines	Italy Avg. 83-85 % (1)	France 1985 % (2)
Anderson	1.1		Fuzalode	—	0.9
Armking	5.2	4.7	Jacquotte	—	0.9
Aurelio	1.1	—	Morton	—	0.6
Early Sungrand	2.3	1.4	Snow Queen	0.6	6.4
Fantasia	2.0	3.6	Other	—	0.1
Firebrite	1.3	—			
Flavortop	0.8	1.5	Total	0.6	8.9
Independence	2.5	1.4			
Maria Aurelia	3.2	—			
Maria Emilia	2.6	—			
Maria Laura	1.6	—			
Maybelle	1.7	—			
May Grand	4.0	1.3			
Nectagrand 4	1.2	—			
Red Diamond	0.1	1.7			
Springred	2.5	—			
Stark Red Gold	3.7	1.3			
Summergrand	0.1	1.8			
Super Crimson Gold	0.5	1.6			
Super Star	2.8	—			
Weinberger	3.2	—			
Other	3.4	6.6			
Total	46.9	26.9			

SUMMARY	Italy Tree Sample No.	France Buds No.
Yellow peaches	237,851	405,740
White peaches	14,649	282,900
Yellow nectarines	301,685	354,390
White nectarines	4,092	117,200
Cling peaches	85,242	69,620
Total	643,519	1,319,850

in importance as a consequence of several serious agronomical problems:
1) suitability of rootstocks to lime and sub-calcareous soils, tolerant of high pH (over 7) and drought conditions;
2) adaptability of rootstocks to replanting, especially on small farms;
3) search for rootstocks resistant to wet soil conditions;
4) ability to propagate the rootstocks through new vegetative methods, including "in vitro" culture;
5) search for dwarf or semidwarf rootstocks, suitable for higher density orchards.

The problems listed at 1, 2, 4 have been overcome with the French hybrid peach x almond GF 677 (now there are two other new hybrids coming from U. C. Davis named Hansen 536, and Hansen 2168) which is tolerant of lime content and drought, as vigorous as, or more so, than peach seedlings, and induces early bearing. It has also good grafting compatibility with both peach and nectarine varieties, and is resistant to rootknot nematodes (gen. *Meloidogyne*). This rootstock was propagated only by green cuttings until a few years ago; now, however, micro-propagation, which facilitates programming of the number of plants year by year (even up to hundred of thousands of healthy, virus-free plants per nursery), is widely used.

A fairly successful rootstock has been obtained in wet and heavy soils by two clones of *prunus insititia*, Damas 1869, and Saint Julien 655/2. The former is suitable only for peach and cling (incompatible with almost all

Table 8. Trend of the Peach Planting Distances in Italy from 1950 to 1980.

Year	Distances Between rows (m)		On row (m)	Surface m^2/tree	Tree No./ha	Training system
1950-60	5.5-6.5	×	5-6	27-39	250-350	vase (open center)
1960-70	4.5-5.5	×	4-5	18-27	350-550	palmette and vase
1970-80	4-5	×	3-4	12-20	500-800	free palmette, spindle, vase
1980-90	4-5.0	×	2-3.5	8-18	600-1500	central axis, free palmette, free spindle, low open center, ipsilon

nectarines), and the latter for all peaches and nectarines. St. Julien 655/2 (which is not deeply rooted) reduces the growth of trees (20-30%), allowing them to be planted closer together; however, it needs fresh, fertile, non-alkaline soils for high yield efficiency. The St. Julien 655/2 especially induces in the peach scion a growth reduction of 20-30% and a more uniform and early ripening. Another noteworthy clone is *Prunus domestica* selection GF 43, resistant to excess soil humidity, vigorous, but with a late bearing inducing capacity, yet unsuitable for replanting. It has been unsuccessful in more than one case.

All the clones of *Prunus* sp. are now propagated in "in vitro"; peach seedling selections and the hybrid GF 677 are preferred by more than 80% of the orchards (except in anamalous soil conditions). They offer a greater probability of high fruiting in proportion to good yearly growth.

4) *Planting and pruning*. Peach planting has undergone considerable changes and modifications in the last 25 to 30 years. The most important variations have been planting density, training, pruning method and rootstock choice. All of these modifications, as is well known, are interdependent and interactive with the variety, environment and scion, thus precluding generalizations of any kind.

Why, it might be asked, have planting densities become so high? The reasons can be summarized as follows:

a) Whatever the system of tree training, the tendency is to get continuous rows, with or without trellis; then the hedgerow looks like a "fruiting wall," 3-4 meters high or, as in the case of dwarfing rootstocks, only 2.5 meters in height (but wider in thickness).
b) The tendency to cover planting cost in a brief period, that is, in the past the so called "unproductive phase."
c) The application of "entire-shoot" pruning techniques based initially on the temporary permanence of almost all branches, even the foremost ones (because of their wider angles), and branch positioning to permit fruiting of excess shoots with the eventual aid of 2-3 horizontal wires.
d) The tendency, in the training period, to replace winter pruning with a spring-summer pruning carried out especially during fruit thinning.
e) Improved use of radiant energy by the leaves, a higher percentage of which have better exposition, intercepting more than 50% of the light, and are more photosynthetically efficient.
f) Tree development is controlled partially by high initial fruiting and competition among root systems; water and fertilizer are guaged to control fruiting and formation of new shoots and branches.

Relatively dense plantings can present certain problems and risks. The main ones are: the tree which fruits as it grows may see its canopy develop-

ment arrested; an increase of fruit quantity to the detriment of quality, which can be due to reduced size and non-uniform ripening, excess shading after 5-6 years and shorter orchard life.

Apricot

Total apricot acreage in the EEC now stands at 60,000 hectares. In Spain, the leading producer, and France, the apricot has been declining for over a decade, while rising in Italy and Greece. Overall, however, both Community acreage and yield have increased about 15% during the last 10 years, with the latter now totalling 3000 thousand tonnes and, despite yearly fluctuations, equal to 50% of Europe's total production if the East European countries are included.

The share of output employed in processing is about 45% in Greece, 35% in Spain and 25% in France and Italy. These rather high figures are still increasing, and it should be borne in mind that the industry receives no Community subsidies. The demand mainly centres on juices, concentrates, frozen apricots for jams and, to a lesser extent, dried fruit rather than canned apricots. Apricots bring even higher prices on the fresh market where they are ready for sale from late May, either before or at the same time as early peaches.

There is, too, a wide range of apricot cultivars but no single "lead" selection that does well under all conditions. Each growing zone has its own typical cultivars—some, as in France, derived from breeding programmes, and others, as in Italy, selected from local types, especially in the Naples region. Local cultivars, which predominate also in Spain, have been well received throughout European markets.

Although no official statistics exist on a breakdown of cultivars in production, the most important ones are: in Spain 'Bulida,' 'Canino,' 'Moniqui,' 'Paviot,' 'Galtarocha' and 'Mauricio'; in Greece, the 'Bebeco' and 'Early Tirynthos' make up 90% of the total; in France, 'Polonias,' 'Rouge de Roussillon,' 'Bergeron,' 'Hatif Colomer,' 'Jaubert,' and 'Rouget de Sernhac'; and in Italy, 'Cafona,' 'Boccuccia' and its clones, 'Palummella,' 'San Castrese,' 'Baracca,' 'Fracasso,' 'Monaco Bello,' 'Pellecchiella,' 'Nonno' and 'Reale d'Imola.' Only a few North American cultivars are to be found in Europe, with 'Harcot,' 'Stark Early Orange' and 'Flaming Gold' being the most notable.

The trend in apricots today is towards large-sized fruits of good colouring, resistant to handling with long shelf-life, good taste qualities and

Table 9. Apricot Cultivars: Up-Dated Nursery Trend.

Apricot	Italy(1) Avg. '83-85 %	France(2) 1985 %
Beliana	—	15.8
Bergeron	—	26.0
Boccuccia	5.1	—
Cafona	11.1	—
Canino	0.3	2.8
Ferriana (Amal)	—	4.1
Harcot	4.3	—
Houcall	—	3.9
Polonais	—	10.6
Precoce di Colomer	8.9	—
Precoce di Imola	5.6	—
Priana (Ouardi)	1.4	6.4
Reale d'Imola	11.1	—
Rouge de Fournes	—	4.8
Rouge du Roussillon	—	18.9
San Castrese	5.0	—
Stark Early Orange	3.6	—
Tirynthos	25.4	—
Other cultivars from Campania*	6.1	—
Other	12.1	6.7
Total %	100.0	100.0
Total trees numbers	29,326	233,600

*Naples area.
(1) Percentage of trees sold yearly (1983-85) by four Italian nurseries.
(2) Percentage of certified buds distributed by CTIFL in France.

possible suitable to the processing industry. Since there are no processing-only cultivars, those with dual-market appeal are the most attractive. There is also scant interest in Western Europe for the otherwise fine varieties grown in Hungary, Romania, Czechoslovakia, Bulgaria and the USSR. Their introduction, while advantageous in terms of adding to the gene pool and genetic variability, would involve an unwanted risk of transmitting viral infections, such as Sharka (PPV, Plum Pox), which have proved particularly virulent in certain areas, Romania in particular.

Table 9 includes the varietal breakdown data for apricot from the same nursery survey cited previously for peach. The findings provide further confirmation of the above-mentioned trend in Italy and France, while also holding true for Spain and Greece in this case. Namely, that each country continues to work with its own varietal stock and that only France and Italy show signs of renewal as each has been introducing home-bred cultivars at a significant rate—France with the new 'Beliana-Sayeb,' 'Priana-Ouardy,' 'Ferriana-Amal,' 'Houcall-Superhatiff,' 'Screara' and the like, and Italy with the new 'Portici,' 'Vitillo,' 'Caldesile 2,' 'Maria Matilde' and other local selections. Again, there are few widely accepted cultivars that do well in more than one country. The most significant of these are 'Canino,' 'Harcot,' 'Tirynthos,' 'Cafona' and 'Hatif Colomer.'

The demand for new plants is still on the rise in Italy, while elsewhere it is either stationary or, as in France, in decline. The apricot also must contend with the problem of rootstocks, which vary from place to place and from cultivar to cultivar depending on grafting compatibility—for example, apricot or hybrid seedling in France, Myrobalan clones in Italy both with and without prune interstocks and various European prune clones. Sanitary fitness, too, is another important criteria in choosing cultivars, with diseases ranging from virus and mico-plasm, like CLR in France, to fungi, like *Cytospora cincta, Eutypa armeniaca* and *Verticillium* sp., and to bacteria like *Pseudomonas syringae* which are concomitant causes in decline and apoplexy.

Cherry

The available data in cherry acreage are not reliable as they are extrapolated from the number of existing plants. These estimates report more than 80,000 hectares under cultivation in the Community. It is a known fact, however, that in many areas the cherry orchards are old and grown with other species. In Italy, for example, even the full cherry orchards are a minority, while in Germany where they are prevalent, these specific plantations now cover 10,000 hectares and account for 260,000 tonnes of cherries. Then, too, only a few cherry cultivars are grown in all the EEC countries, whether northern or southern. The sweet cherry predominates in the south and the sour, or its hybrids, in the north.

With strawberry, the cherry is the season's first fruit on the market and always brings relatively high prices. However, such factors as high yield variability, large tree size, high management and picking costs and slow or late bearing have induced many growers to abandon without renewing old orchards. These drawbacks are currently being addressed by new cultivars with compact tree canopies and reduced height, semi-dwarfing rootstocks and eventually full mechanization of pruning and harvesting—the latter at least for sour cherries—all of which have begun to spur renewed interest in this crop. There is, too, a solid demand by the processing sector for juices, syrups, jams, confections, cherries in spirits and liqueurs.

Again, there are no official data as to cultivar breakdown by country. However, for Italy and France, the nursery survey and the CTIFL data would seem to indicate that about ten cultivars are routinely grown in the

two countries (Table 10). The most important are 'Bigarreau Burlat,' 'Bigarreau Moreau,' 'Bigarreau Napoleon,' 'Bigarreau Hedelfingen,' 'Durone Nero III' of Vignola, 'Stark Hardy Giant' and 'Van,' which are firm, dark flesh cultivars. 'Bigarreau Napoleon,' 'Durone della Marca' and other white flesh cultivars are highly regarded by the processing industry.

Nursery demand for new trees is on the rise so that even the nurserymen are renewing varietal assortments and rootstocks. The self-pollinating cultivars 'Stella,' 'Sunburst' and 'Lapins' are the most important for growers in less favourable climates. The compact clones and spurs of 'Van,' 'Bing,' 'Bigarreau Burlat,' 'Lambert' and 'Stella,' may be employed with such semidwarfing rootstocks as Colt, the Maxma Delbard hybrids 14 and 97, the CAB series, Vladimir, and GM 61 and 79 to establish high-density orchards with 400-700 trees per hectare as against the current 100-200 tree plantings.

It should also be pointed out that cherry growing has often received new impetus from local initiatives. In Italy, for example, the Emilia-Romagna regional government promoted the planting of 500 ha of cherry orchards in the Vignola area with the financial and technical support of local municipalities and public agencies.

Plums and Prunes

Total EEC plum and prune acreage currently stands at about 60,000 hectares with a yield of approximately 1 million tonnes yearly. Acreage has increased about 10% over the last decade. Spain, the leading producer, recorded the largest rise at 30%, followed by Italy, while France reported a 5% decline equal to about 1000 hectares. From 1975 to 1985, EEC yield increases were significant, while in the other European countries it declined (Table 2). The Community accounts for one-third of the total European production which stands at 2.8 to 3.1 million tonnes. Such East European nations as Yugoslavia and Romania alone account for 600-700 thousand tonnes yearly, making them the leading producers.

Also noteworthy is the predominance of European prunes over the Sino-Japanese plums and myrobalan hybrids. In Eastern Europe as well as in France the crop is most often associated with prunes, or with other types of *Prunus domestic* such as 'Reine Claude' and 'Mirabelle.' In Italy, by contrast, the Sino-Japanese plums are dominant. A nursery survey conducted 6 years ago showed a slight trend towards the European rather than the Sino-Japanese plums (from 52 to 66%). However, in the aftermath of a disastrous drop in demand for certain

Table 10. Cherry Cultivars: Up-Dated Nursery Trend.

Cherry	Italy(1) Avg. '83-85 %	France(2) 1985 %
Bigarreau Burlat	6.4	22.2
Big, Geant d'Hedelf	2.3	10.8
Big, Moreau	9.3	—
Big, Napoleon	2.3	13.8
Big, Rainier	—	6.7
Durone Nero I	13.8	—
Durone Nero II	6.6	—
Durone Nero III	0.5	4.9
More*	5.3	—
Stark Hardy Giant	3.5	10.0
Stella	7.4	—
Van	8.2	11.5
Compact & Spur Sports	11.9	—
Other foreign cvs.	3.6	—
Other	12.1	15.4
Sour cherry	6.8	4.7
Total %	100.0	100.0
Total trees numbers	36,895	156,000

*Di Vignola, di Cazzano, di Cesena.
(1) Percentage of trees sold yearly by four Italian nurseries.
(2) Percentage of certified buds distributed by CTIFL in France.

prunes, especially the 'Stanley,' many orchards were thoughtlessly cut down. As but few used mechanical harvesting to keep costs at competitive levels, they were re-established with the new Sino-Japanese cultivars of larger, more attractive and earlier, July-ripening fruits.

There are, therefore, sharp distinctions in prune and plum growing among countries as well as in terms of market orientation. Industrial demand such as dried fruit, distillation and other processing sectors account for a large market share in Romania, Yugoslavia and France (over 40%), whereas it represents only 15% in Spain and 5% in Italy. It is evident from these figures that Italy and Spain produce mainly for the fresh market. France, for example, possesses the technology to remain competitive in the processing market. Despite this, the crop seems to be declining in this as in other countries. Among other nations, West Germany has a high yield at over 4000 thousand tonnes which derives mainly from home orchards or gardens and the households themselves consume 60%. The remaining 40% is evenly divided between the fresh and processing markets.

Varietal breakdown data are very fragmentary in the absence of official statistics. The Italian nursery survey and the French CTIFL scion data are thus primary sources (Table 11). They indicate that, in France, there is a trend toward crop renewal through the use of the INRA's new 'Lorida,' 'Primacotes' and 'Tardicotes' cultivars. The three accounted for nearly 30% of all graftings in 1985 as against the 37% for the 'Agen Prune 707' and 303 clones, and even lower for 'Reine Claude' and 'Mirabelle de Nancy.' In Italy, the European cultivars accounted for only 12% of the total; the most important were 'Bluefre,' 'President' and 'Stanley,' which are mainly fresh market cultivars. Among the Sino-Japanese plums, 5 new American cultivars, 'Angeleno,' 'Blackamber,' 'Black Diamond,' 'Black Gold' and 'Black Star,' were heavily promoted. They are large-sized fruits, averaging over 100

Table 11. Plum Cultivars: Up-Dated Nursery Trend.

European Varieties	Italy(1) Avg. 83-85 %	France 1985 %	Sino-Japanese Varieties	Italy(1) Avg. 83-85 %
Bluefre	2.4	—	Angeleno	42.1
California Blue	0.7	—	Black Diamond	10.3
Lorida	—	13.2	Black Gold	8.1
Mirabelle de Nancy	—	9.4	Black Star	8.8
President	1.9	—	Friar	0.9
Primacotes	—	8.0	Morettini 355	2.9
Prugna d'Agen Group	0.3	37.1	Ozark Premier	6.6
Regina Claudia Group	1.5	5.3	Santa Rosa	2.3
Ruth Gerstetter	0.4	—	Shiro	2.7
Stanley	3.0	2.8	Sorriso di Primavera	1.9
Tardicotes	—	6.1	Other	2.3
Zucchella	0.5	—		
Other	0.4	18.1*		
Total %	11.1	100.0	Total %	88.9
Total tree number	12,618	287,000	Total trees number	101,056

*Including Sino-Japanese plums.
(1) Percentage of trees sold yearly by four Italian nurseries.
(2) Percentage of certified buds distributed by CTIFL in France.

grams, and have very darkpurple skin. They have caused a decline in demand for 'Ozark Premier,' a large but tender fruit, 'Griar,' 'Calita' and the other cultivars used as pollinators like 'Santa Rose,' 'Sorriso di Primavera,' 'Shiro' and 'Obilnaja.'

The general view is that the Sino-Japanese plums have room for further expansion in the southern growing regions as they need a relatively mild spring climate, particularly at flowering.

Conclusions

Current levels of EEC stone fruit production are so high as to all but preclude further expansion. Coupled with the alarming peach and European prune surpluses, the overall outlook points as well to a fast approaching market saturation in apricots and other species.

The issue, therefore, is not whether or where to put new areas under orchard cultivation. It is rather how and where to restructure the orchard industry and where to cut down old orchards and re-establish new ones. For example, in Italy, table grapes and strawberry are finding new acreage in the south because of that area's more favourable climate *vis a vis* the north. Stone fruit orchards, too, are now expanding southward.

Such land use options are, however, essentially national policy choices, and, given the difficulties involved in predicting the course of action of others, we as scientists can venture no further than educated assessments.

Noteworthy in this connection is the leading role that France and Italy would assume in the process of orchard renewal. For these are the only two countries in which over half the needed peach (4-6 million yearly), apricot (500-800 thousand), cherry (350-600 thousand) and plum and prune (320-310 thousand) trees would be available.

Luckily, the most farsighted nurserymen are aware of this situation and are in a position to supply growers with the necessary genetic-sanitary guarantees. Such nursery readiness has been aided by recent technological advances, especially *in vitro* propagation of rootstocks and even scions. The importance of this field and its marked expansion in the last 10 years can be seen from the data in Table 12 and Figure 2, concerning nursery output for a single region of Italy. It should also be noted that kiwi, peach and apricot are among the most receptive species to self-rooting.

Table 12. Micropropagated Plants Produced in Italy (1985)(•).

Rootstocks	N. (000)	%
Peach × Almond GF677	4,000	87.9
St. Julien GF 655/2	300	6.6
Damas 1869 e GF 43	80	1.8
Myrobalan B	50	1.1
Cherry: Colt, CAB 6P, CAB 11E, etc.	120	2.6
Total	4,550	100.0

Scions	N. (000)	%
Actinidia	1,000	90.5
Peach	50	4.5
Apple and Pear	5	0.5
Strawberry	50	4.5
Total	1,105	100.0

Source: C.A.V.—Nursery board, Bologna (1986).

In conclusion, I should like to point out that the more advanced countries have already adopted a variety of measures in regard to nurseries. These include *ad hoc* growing and commercial regulations, voluntary or compulsory stock and scion certification, rights covering the propagation of patented cultivars, and the publication of data sheets listing recommended varieties to growers. Some nations have even implemented certain restrictions. France, for example, has limited the list issued by the C.T.P.S. of cultivars allowed to be commercially propagated, whereas others let nurserymen freely propagate and sell what they

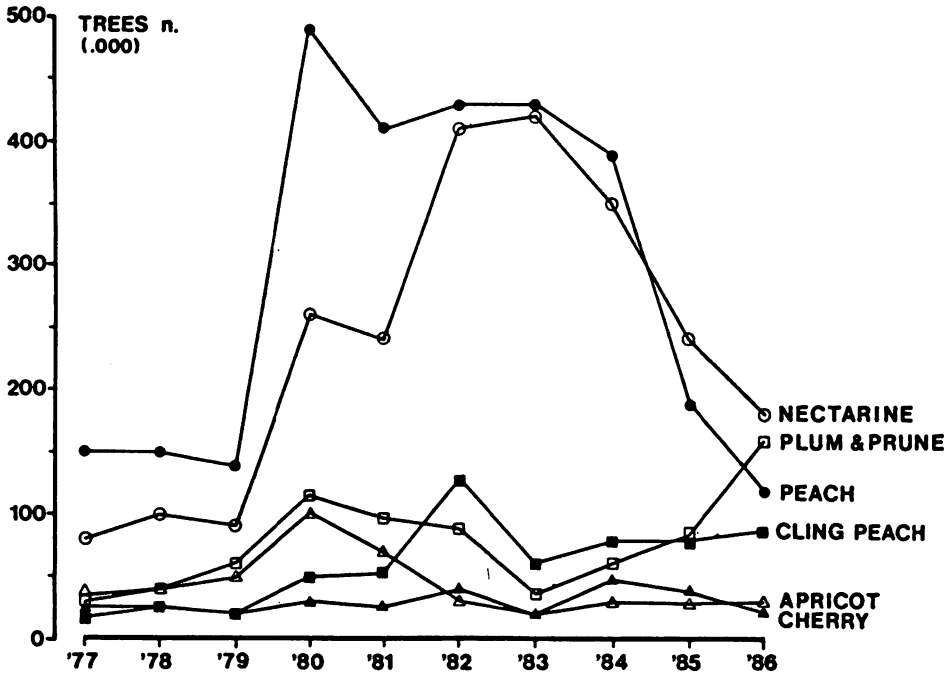

Figure 2. Trend of trees produced by nurserymen in Italy.

want, except where patent rights are involved.

Thus, the new orchard industry needs first and foremost an up-to-date and efficient nursery sector.

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