

Mrs. Smith Goes to Washington¹

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'Granny Smith', an old apple cultivar from Australia, is being planted in record numbers in Washington and some other states. It may be America's number 3 apple within this decade.

In a popular movie of the 1940s, "Mr. Smith Goes to Washington," an apolitical, newly elected senator upset many of the entrenched individuals and political ideas then dominating the nation's capital. Now another Smith, an apple named Granny, is having similar unsettling effects in another Washington, in this case the apple state.

During the past several years the highest-priced apple in American supermarkets has been neither 'Delicious' nor 'Golden Delicious'. The "money apple" by a fairly wide margin has been 'Granny Smith'. Many people are astounded that this hard, green, tart interloper is being sold in volume in supermarkets across the country at 10 to 20¢ per pound more than our major American cultivars. Until recently, all "Grannys" sold in this country were imported from the southern hemisphere. During the past three years, however, a fair volume of Washington state and French "Grannys" have been making their way into American markets. Let's take a closer look at the 'Granny Smith' including its origin and history, its tree and fruit characteristics, its cultural requirements, its place in world apple production, and its current and future status in American apple production.

Origin and history

'Granny Smith' originated on the property of Mr. and Mrs. Thomas Smith of Ryde near Parramatta, New South Wales, Australia, in the 1850s. As reported in a 1924 issue of the *New South Wales Agriculture Gazette*, Mrs.



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Smith (Granny) dumped some rotting Tasmanian French crab apples onto a creek bank near their orchard. From these apples, a chance seedling grew among the ferns and grass. By 1868 the fruit from this tree was considered in the local area as being a good eating apple and having fine cooking qualities (6, 9).

The first plantings of this new cultivar named after Mrs. Smith were made on the New South Wales Government Experimental Farm at Bathurst in 1895 (9). It was not planted to any extent commercially until after 1900, and it did not become an important apple in world commerce until the 1950s. By 1960 'Granny Smith' accounted for over 25% of Australian apple production (9), and it was an important cultivar in several other southern hemisphere countries including Argentina, New Zealand, and South Africa. During the late 1960s and 1970s, it was widely planted in France, Italy, Chile, and Spain. It made its way into U.S. orchards in the mid 1970s, primarily in central Washington.

Horticultural characteristics

Tree is vigorous, upright, with willowy or whippy growth and large, dark-green leaves. 'Granny Smith' is a partial tip bearer, and blind wood can be a problem in early years unless the trees are carefully managed (Fig.

1). 'Granny Smith' trees are similar in several growth and fruiting characteristics to 'Rome Beauty', and it is equally as susceptible to powdery mildew as 'Rome Beauty'.

Fruit is medium-to-large, and round-to-slightly conical. Skin is smooth with light-colored lenticels and an overall color of bright to pale green at proper harvest maturity (about 180 to 190 days from bloom) (Fig. 2). Flesh is white, crisp, juicy, and subacid. The core is small (9).

The fruit turns creamy green or buff yellow with advancing maturity. "Granny" is an excellent storage cultivar, in spite of susceptibilities to storage scald and bitter pit. After long storage, the surface wax can be very greasy.

Culture

'Granny Smith' has been grown successfully on many root systems with diverse tree spacings, utilizing highly variable training and pruning methods as well as different cultural regimes. Some of the different practices and recommendations are logically based on variations in climate or soils. Others relate to economics, tradition, or perhaps the influence or opinions of an individual or organization in a given locality or country. In the final analysis, it appears that 'Granny Smith', like most good apple cultivars, is fairly adaptable to varying conditions and peculiarities of both people and places. Following are some of the more accepted conditions and practices for commercial 'Granny Smith' production.

Selections. The standard nonspur 'Granny Smith' predominates commercial plantings in all countries (2). A number of spur-type selections have been found, but most have tree or fruit characteristics which are inferior to the standard "Granny". As 'Granny Smith' plantings expand, it is likely that some superior spur or nonspur mutations will develop.

Rootstocks. In Australia, seedling stocks have been used almost exclusively in established commercial orchards, while Malling Merton (MM) 106 and Malling (M) 1 have been recommended for more intensive plantings. Semi-dwarfing stocks of Northern Spy seedlings or MM 106 are preferred for New Zealand. In fact, some of the world's highest apple yields have been from 'Granny Smith'

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Fig. 1. These 4-year-old 'Granny Smith' on M26 in central Washington are trained to central leaders and supported by trellis (note wires over tree tops). Early training, spreading, and pruning have reduced the willowy, blind-wood problem typical of this cultivar. (Photograph taken 2 months prior to harvest.)

on MM 106 grown in Hawke's Bay, New Zealand. In South Africa, MM 106, Merton 793, and seedling are preferred stocks (3). M 9 is the most popular stock for Granny Smith in France. In the United States, M 26 has been the dominant rootstock to date, primarily because of the desire for early production and the exceptional influence of Grady Auvil, a highly successful Washington apple grower. MM 106, MM 111, and M 7 also appear suitable for U.S. plantings, depending on soil and management considerations.

Tree spacing. In the United States, tree spacings vary from double rows planted about 1 m apart with work row spacings of 3 to 4 m on M 26 to 2.5×5 m for more vigorous stocks such as MM 106. Spacings of 3×5 or 4×6 m have been highly successful for New Zealand plantings on MM 106. In Australia, 6×6 m is the standard spacing for 'Granny Smith' on seedling rootstock. A rootstock/spacing study in South Africa indicated that the maximum calculated density for 'Granny Smith' was 1267 trees/ha on MM 106 (about 2×4 m), and 833 on Merton 793 (about 2.7×4.5 m). 'Granny Smith' trees were smaller than 'Golden Delicious' trees on all rootstocks tested (3).

Training and pruning. In all areas it is well-recognized that 'Granny Smith' is a vigorous, leggy cultivar which requires specialized attention to develop a sound, fruitful framework and to avoid excessive blind wood. Spreading vigorous laterals into a nearly horizontal position promotes lateral branching and greatly reduces the blind-wood syndrome

(2). This can be effectively accomplished on free-standing, central leader trees with tree spreaders, coiled training wires, or twine clip tie-downs (2). In both New Zealand and South Africa, it is generally recommended that in order to succeed with good tree training it is necessary to plant large, well-feathered, single leader nursery trees (7).

In the United States, 'Granny Smith' is the only cultivar that is extensively planted on M 26 and trained to a wire trellis (Fig. 1). The training systems in these orchards range from central leaders to nondescript palmettes. In South Africa, most growers train 'Granny Smith' to a palmette shape, ending up in a solid fruiting wall. Securing the branches to wires and developing a dense tree reduces sunburn, which is a serious problem for this cultivar in high light intensity regions (4). Delayed heading is widely used to reduce the blind-wood problem.

Pollination. 'Granny Smith' is self-incompatible in most regions. Provisions must therefore be made for cross-pollination. 'Delicious' and 'Golden Delicious' are the primary pollinators for 'Granny Smith' in southern hemisphere countries and in France. These cultivars plus 'Rome Beauty' and 'Winter Banana', are considered as the principal pollinators in most central Washington areas (2).

Other cultural requirements. It is generally believed that 'Granny Smith' has a higher nitrogen requirement than most apple cultivars. This is partially due to the need for extensive growth in order to develop a dense canopy and reduce sunburn. In South Africa, about 50 cm of terminal growth is preferred on bearing trees. 'Granny Smith' is subject to bitter pit before and after harvest. Preharvest sprays and postharvest dips of calcium are recommended in New Zealand and Australia. As indicated previously, 'Granny Smith' is highly susceptible to powdery mildew. One of the spur-type strains apparently has a virus problem (2). Its susceptibility to other major diseases in the United States remains to be determined.

'Granny' is generally considered to be self-thinning, but because large fruit is required in most markets, many growers now thin chemically. Low rates of Carbaryl and/or naphthaleneacetic acid (NAA) or combinations of Elgetol and daminozide applied late are frequently used (8).

Harvest maturity. 'Granny Smith' is a long season apple. In the southern hemisphere, it requires 180 to 190 days from full bloom to harvest in order to attain suitable maturity for long storage and freedom from scald (5). Early harvest can result in storage scald even when atiscald sprays or dips are used (5). Seasonal requirements have not been fully determined in North America. There is some indication that 'Granny Smith' may reach adequate maturity in about 165 days in some of the high light intensity, warmer areas of central Washington, but whether it will have acceptable quality under these conditions has not been fully determined.

World production

The world production of 'Granny Smith' is slightly over 700,000 MT annually, placing it in fifth place among world cultivars (Table 1). It currently accounts for 3.7% of world apple production. 'Delicious' and 'Golden Delicious' make up 50% of world production, and the other major apples of world commerce are 'Jonathan', 'McIntosh', and 'Rome Beauty' (Table 1). It is interesting to note that 'Granny Smith' is the only cultivar of the 6 that did not originate in North America.

Major producers of 'Granny Smith' are Argentina, South Africa, Australia, France, New Zealand, Chile, Italy, and Spain (Table 2). Production of 'Granny Smith' in most of these countries increased substantially during the 1960s and 1970s, and modest-to-high increases are apparently expected to continue, except in Australia, which expects a modest decrease, according to some production forecasts by the New South Wales Department of Agriculture.

U.S. Developments

The United States produced 7000 MT of 'Granny Smith' in 1981, or about 1% of current world production. This was the first time that 'Granny Smith' was included in the apple production listing of the USDA Statistical Reporting Service (1). Most of this production was from central Washington. During the past decade, Washington growers have planted over 1000 ha of 'Granny Smith'. Much of this acreage is on precocious rootstocks at high densities, and many of these plantings are expected to reach reasonably high levels of production by the mid-1980s. Thus Washington could be producing 60,000 MT (about



Fig. 2. 'Granny Smith' fruit are medium-to-large in size, and round-to-slightly conical in shape. overall color is bright to pale green at proper harvest maturity. (Fruit are pictured 2 months prior to harvest.)

3 million boxes) of 'Granny Smith' by 1985–88. This would exceed the current combined production of 'Winesap' and 'Rome Beauty' in the state of Washington.

Some apple industry leaders believe Washington will be producing 10 million boxes (190,000 MT) of 'Granny Smith' in another 10 years and that "Granny" will replace 'Golden Delicious' as the second most important apple cultivar in Washington and the United States.

Washington is not the only state that has planted 'Granny Smith'. Some confidential reports indicate that California has about the same area planted to "Mrs. Smith" as Washington. Most of these trees have also been planted on precocious stocks at high density. Nearly all are trellised, and they have been "pushed" with nitrogen to ensure vigorous tree growth. California observers expect 3 million boxes of 'Granny Smith' from that state within 5 years.

'Granny Smith' trees are being planted in lesser numbers in nearly every apple area of America. Even though the long season requirement will eliminate many of the northern states, there is substantial interest for extensive "Granny" plantings in such states as Arizona, North and South Carolina, and Georgia. Nearly every week we hear of a new planned development either in the west or the southeast.

Table 1. Production of the world's major apple cultivars 1978.⁴

Cultivar	World production	
	Thousands of metric tons	% of total
'Delicious'	5143	26.8
'Golden Delicious'	4457	23.2
'Jonathan'	1162	6.1
'McIntosh'	762	4.0
'Granny Smith'	705	3.7
'Rome Beauty'	666	3.5
Total apples ²	19165	100.0

²Source: USDA-FAS. 1979 International Apple Institute Reference Book and Directory.

³Includes 32 countries surveyed by USDA, FAS. Believed to comprise a major portion of world apple production, but does not include a number of relatively important countries, e.g., Soviet Union, and People's Republic of China, as well as some Eastern European countries.

The future and Mrs. Smith

'Granny Smith' has unquestionably become one of the world's prominent apple cultivars. It has proven itself in diverse, long-growing-season regions of the globe and in the orchards of some of the world's most discriminating and sophisticated apple growers. It appears probable that 'Granny Smith' will be the third most important world cultivar within this decade.

This does not imply that 'Granny Smith' is without faults or potential problems. Its long maturity requirement will automatically eliminate it as a viable commercial cultivar in many of the world's apple-growing regions. The long-season requirement is not a fault of this cultivar, but inevitably some apple growers will have difficulties trying to grow it in areas where it is not adaptable. As indicated earlier, 'Granny Smith' requires special tree care and unique management in order to obtain good production of marketable fruit. Susceptibility to sun blush, sunburn, bitter pit, and scald usually results in high cullage. One of the southern hemisphere's premier 'Granny Smith' growers told me that his average cull-out is 42%. This is because the southern hemisphere export markets will not tolerate a blushing "Granny"; "Grannys" must be solid green. On the other hand, it is a good processing apple, so the cull-out fraction has sound commercial use.

Some American producers believe our markets will accept a blushing "Granny" and that we might develop a unique "American Granny"; that is, a green apple with an orange cheek. This hope may be wishful thinking. The real 'Granny Smith' is a distinctive green apple with a tart taste that is entirely different from 'Delicious' or 'Golden Delicious'. This difference is one of the reasons "Granny" is becoming so popular in the United States. 'Delicious' and 'Granny Smith' make an attractive, contrasting combination in the supermarket—a green apple and a red apple, a sweet apple and a tart apple.

How many 'Granny Smith' can be sold at fresh market in the United States? Some believe 10 to 15% of our current fresh sales, or about 10–15 million boxes. The final answer must await the test of time. It will ultimately depend on the quality of the 'Granny Smith' apple as produced in America, how

Table 2. Production of 'Granny Smith' apple, by country, 1978.⁴

Country	Thousands of metric tons	% of each country's production
Argentina	198	24.4
South Africa	187	21.5
Australia	100	38.7
France	84	4.7
New Zealand	62	33.8
Chile	36	23.2
Italy	27	1.5
Spain	12	1.2
Total world	706	

⁴Source: USDA-FAS. 1979 International Apple Institute Reference Book and Directory.

well our "American Grannys" compete with 'Granny Smith' imports, and the fickle and changing nature of the American consumer.

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