Quote: . . . we strive to keep the tree soft with a single dominant trunk and . . . soft bearing units originating directly on the trunk.

My Plum Orchard for the Year 2000

Nigel C. Cook
Department of Horticultural Science
University of Stellenbosch
Matieland, South Africa

Reprinted from *Deciduous Fruit Grower*, January 1997.

This article is based on observations and experiences with high density plantings with plums in recent years. There are a few systems that I feel will have a place in the future, the selection of which will depend on the growth habit of the variety and the growers' requirements and production preferences. The vertical spindle is merely a central leader that has been adapted to plums at the slightly higher densities being planted at present. For plums I feel that there is still a future for V-trellis systems with cultivars with a more spreading growth habit. These Vs can be planted as a) a single row with each tree split into two leaders, one on each side of the trellis, or b) as a double row with each tree having one leader, planted (unheaded) at an angle and secured to one side of the trellis.

Spacing for upright systems will be 1.0 to 1.5 m (3.2 to 4.9 feet) in the row and 3.5 to 4.0 m (11.5 to 13.1 feet) between the rows. This gives densities of 1667 to 2857 trees/ha (675 to 1156 trees/acre). Plantings of single row V-trellis will be spaced from 1.0 to 1.5 m in the row, while double-row systems are spaced at 0.5 to 0.75 m (1.6 to 2.5 feet) in the row. With either option there is between 1.0 to 1.5 m between the leaders on each side of the V. Between the row a 4 m (13.1 feet) spacing is suggested. This gives tree densities of 1667 to 5000 trees/ha (675 to 2024 trees/acre) with the double-row system.

THE TREE

Generally we strive to keep the tree soft with a single dominant trunk and a definite taper to a soft top. The soft bearing units originating directly on the trunk are not necessarily permanent, although we do try to keep them as long as possible, at least 4 to 5 years. While the tree lacks a defined base, a conical form is maintained.

The trees are not headed at planting, as this practice reduces tree growth. Trees not headed at planting had a trunk circumference twice that of trees headed at planting. In fact, any pruning in the vegetative phase of the orchard's life is dwarfing and delays fruiting. A detailed description of the unheaded training route is included in this issue (from January 1997 *Deciduous Fruit Grower*). This method of tree training addresses the particular growth habit of plums. In short, plums are acrotonic, upright and basal dominant and one must, therefore, pay attention to correctly manage bud break and subsequent growth. Bending instead of summer pruning is the preferred manipulation for vegetative growth management. Less pruning and more bending result in more soft laterals which means more complexity and, thus, earlier production.

PRODUCTION

The performance of an orchard is measured by its production. The following production estimates are attainable with cultivars like Songold and Laetitia: Year 2 (10 t/ha); Year 3 (25 t/ha); full bearing (40+ t/ha).

Some actual production figures are presented in Table 1 while Table 2 presents packout and size specifications from some of these orchards. The improved size and quality are probably due to better light distribution within these soft trees. Furthermore, I believe that continued production of fruit of good size is a function of light distribution and complexity, and the grower has the ability to manage both of these attributes. From the third leaf onward, we are experiencing improved picking, thinning and pruning efficiency, probably because of the smaller size and more labor friendly shape of these trees.

It should be noted that the timely execution of manipulations during the initial training years is crucial. This not only applies to the bud break manipulations but also bending manipulations. Our experience has shown that by visiting each tree every week from November to February (May to October in the northern hemisphere), the total man hours required for bending is reduced. This is due to the fact that when a shoot is bent at the correct stage the actual manipulation is not only easier but also more effective in terms of the required effect on tree form.

BEARING WOOD MANAGEMENT

I believe that bearing wood management in plum high density plantings needs a new approach. The current system used on our wider plum plantings is based on an annual and fairly rigorous renewal of bearing wood. In our high density plantings, we do not have the space for too many 1-year-old shoots that can easily aggravate light distribution within the tree structure. We have recently opted for alternative approaches that rely more on the natural ability of fruiting wood to maintain vitality provided these fruiting branches are maintained in a more favorable light environment. We are working with bearing units that are soft and flat, a system very similar to those used in high density apple plantings in Europe, i.e., the “Lang Snoei” of the Dutch spindle and the more recent French “fruiting branch” concept.

This approach can be summarized as follows: In plum high density plantings there is no room for 1-2-3 pruning role. It is the renewal steps 2 and 3 that cause excessive and vigorous shoots. We prefer to apply the 3:1 ratio rule on previously flattened bearing units so as to diffuse vigor over the entire bearing unit axis. One still has to remove all upright growing shoots from the fruiting branch as they tend to become dominant and disrupt the otherwise balanced architecture of the fruiting branch. Any forks on the fruiting branch should also be removed. Provided the light distribution within the tree is optimal, it will be necessary to remove/renew only bearing units, by means of a thinning-out cut, when they become too strong (referred to as “groeitakken” by the Dutch) or runt out (>50% dieback of spurs). Good light management ensures regular production and consistent quality via maintained vigor in the bearing units. So far we have had great success with this method of bearing wood management and are confident that with judicious pruning and thinning we will be able to maintain fruiting units for up to 5 years and longer.

To sum up for the year 2000, I see plum orchards trained from unheaded whips where the bulk of manipulations (bending) is done in the first leaf. The trees have a central axis that tapers to a soft top with soft, precocious bearing units positioned directly on the trunk. Tree vigor is slowed by higher and earlier production so that the tree maintains a balance between vegetative and reproductive growth, within the growth habit, on a smaller, more light efficient structure. While we currently attain this balance of tree architecture on the vigorous Marianna rootstock, we eagerly await the introduction of more precocious rootstocks. With spacings, I prefer to plant close enough for the worst site in the block. It is easier to maintain size than to gain size when the trees are naturally slowing down. Generally within the previously mentioned spacings I plant

wider on better sites. Regarding systems, I personally feel that the V is the most efficient from a light utilization point of view. Economics will determine whether the V-trellis or the vertical spindle will dominate in the future.

Table 1. Actual production (t/ha) over the first 4 years for plum high density plantings with different training and spacing.

			Production (t/ha)			
Cultivar	System	Spacing (m)	Year 2	Year 3	Year 4	Total
Songold	Spindle	4x1	0	21	10	31
Songold	Spindle	4x1	6	—	—	6
Songold	Spindle	4x1	12	21	—	33
Songold	V	4x0.5	5	18	30	53
Songold	V	4x0.5	12	30	55	97
Songold	V	4x1.5	0	65	—	65
Laetitia	Spindle	4x1	0	35	14	49
Laetitia	Spindle	4x1	10	—	—	10
Laetitia	Spindle	4x1	10	21	—	31
Laetitia	V	4x1.5	0	55	—	55
Sapphire	Spindle	4x1	8	—	—	8
Sapphire	Spindle	4x1	16	—	—	16

Table 2. Fruit quality as % Class I and peak fruit size for plum high density plantings with different training and spacing.

			1st year		2nd year	
Cultivar	System	Spacing (m)	% Class I	Size peak	% Class I	Size peak
Songold	Spindle	4x1	70	AA	71	AA
Songold	Spindle	4x1	46	A	—	—
Songold	V	4x1.5	94	A	—	—
Laetitia	Spindle	4x1	79	AA	77	A
Laetitia	Spindle	4x1	38	AA	—	—
Laetitia	V	4x1.5	77	AA	—	—
Sapphire	Spindle	4x1	50	A	—	—
Sapphire	Spindle	4x1	60	A	—	—