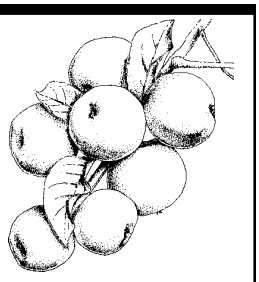
UMass EXTENSION Working Partners

Tree Fruit Program

Integrated horticultural and pest management of fruit trees in Massachusetts Orchards.



Importance of Chemically Thinning Apples as It Relates to Fruit Size

Wesley Autio & Duane Greene, *Department of Plant & Soil Sciences*

Glenn Morin, *New England Fruit Consultants, Montague, MA*

What is the single most important characteristic of your fruit that determines its value, particularly in the wholesale market? Several factors affect value, such as color and blemishes, but most growers are able to alter these factors to maximize value. The one factor which truly controls the value is size. In this leaflet, we would like to focus on the relationship among size, net returns, and chemical thinning.

First, it is important to consider the costs of producing apples. Table 1 gives rough averages for the various costs of production, but they can be summarized as $1200 per acre to grow apples and $8.50 per bushel to pick, store, pack, truck, and market apples. Next, you must consider the returns. Table 2 presents average returns in 1996 for various categories of apples. These returns vary from $3.00 per bushel for cider apples to $15.75 per bushel for packed 80-count apples.

The remainder of this discussion will refer to relative cropping levels. Let us assume that a relative yield of 1 (approximately 600 bushels/acre) will result in fruit size of about 150 g (19,000 g equal 42 lbs). Also, we will assume that 15% of any crop will go to cider. At a relative yield of 1 and fruit size of 150 g, approximately 50% of the yield would be 120's and 35% would be 140's. Assuming that one half of the 120's was packed and one half was bagged, the average return per bushel would be $8.50. Therefore, the returns would equal the post-growing costs, and overall $1,200 would be lost per acre.

If the number of fruit was reduced by one third, the yield would be reduced by 20% and the average size would increase to approximately 175 g. This size would result in 33% 96's, 42% 120's, and 10% 140's. Again assuming that one half of the 120's was packed and one half was bagged, the average return per bushel would be $10.60. The gross return from this crop would be $4,950 per acre. The production costs would be $5,175 per acre (post-growing costs = $3,975 per acre and growing costs = $1,200 per acre); therefore, the net returns would be -$225 per acre.

If the number of fruit was reduced by one half, the yield would be reduced by approximately 35%, and average size would be 190 g. This situation would result in 5% 80's, 60% 96's, 15% 120's, and 5% 140's. The average return per bushel would be $12.50,

Table 1. Average costs of producing apples.

Category	Cost
Growing	$1,200.00/acre
Post-growing	$8.50/bushel
Picking	$2.00/bushel
Storing	$1.00/bushel
Packing (including box)	$4.00/bushel
Trucking	$0.50/bushel
Marketing	$1.00/bushel

Table 2. Average returns for apples in New England in 1996.

Category	Return
80-count cell packs	$15.75
96-count cell packs	$15.50
120-count cell packs	$10.50
120-, 140-, 160-size in bags	$9.00
Cider	$3.00

assuming that one half of the 120's was packed and one half was bagged. The gross return would be $4,700 per acre, somewhat less than from an 80% crop; however the overall costs would be less also. Production costs would total $4,400 per acre (post-growing costs = $3,200 per acre and growing costs = $1,200 per acre). The net returns, therefore, would be $300 per acre.

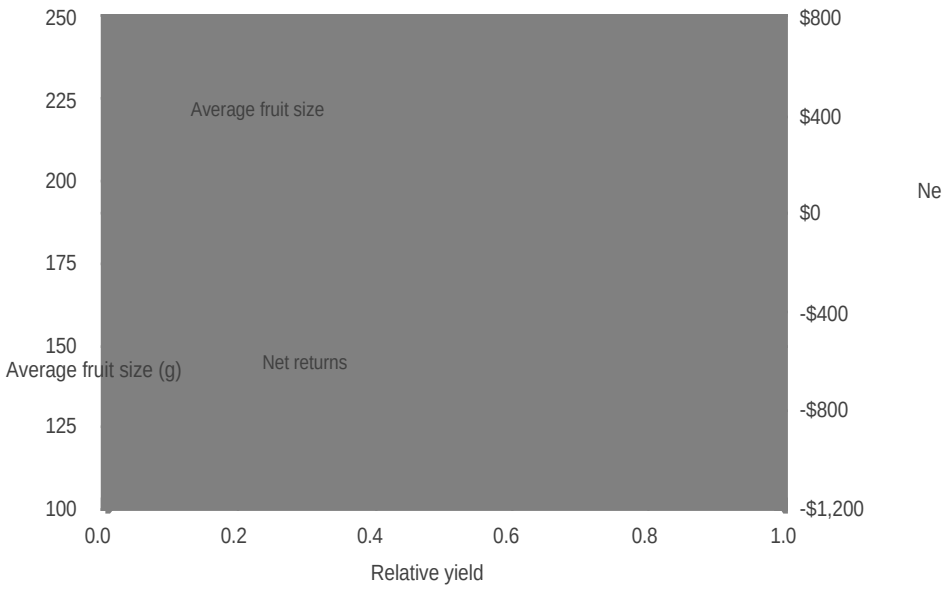
Clearly, this exercise shows that reducing yield can result in greater returns, primarily because of the increase in fruit size. Let us take it one step further. If the number of fruit was reduced by 75%, the yield would be reduced by 60%, and the average fruit size would be 230 g. The result would be 68% 80's and 17% 96's. The average return per bushel would be $13.80, but because of the reduction in yield, the gross returns would be only $3,150 per acre. The post-growing costs would be $1,950 per acre, and the growing costs would still be $1,200 per acre. Therefore, there would be no net return per acre.

These data are summarized in the figure below. It shows that the relationship between yield and fruit size (and therefore fruit value) peaks when average fruit size reaches about 200 g (average size = 96 count) and the yield is about 60%. In this example, maximum profit would be obtained if the total yield was 350 bushels per acre, with most fruit in the 96 size class. Obviously, there is a great deal of variability about these data. Strains, rootstocks, soil, irrigation, season, and picking efficiency all affect the position of this peak relative to yield. However, most growers function in the right-hand side of the graph, near the break-even point, and most would benefit from reducing yields to gain size.

It is clear that the consequences of having too many fruit, and therefore small size, are worse than those of having too few fruit. This statement can be translated to say that the consequences of underthinning are worse than those of overthinning.

Thinning strategies should aim for maximizing 96-count apples, even at the expense of yield. For many of you, this will mean becoming more aggressive. One way to enhance your changes of adequate thinning is to use a multithinning approach. The first treatment should be at petal fall. Include Sevin at the very least, plus NAA or Accel if you want to be more aggressive. Thin again when fruit are 10mm in diameter, again with Sevin, plus NAA or Accel. If you have not had good thinning weather and you do not appear to have adequate thinning by the time the fruit are 18mm, then thin again, using Sevin only. This approach will allow you to be more aggressive, but also will spread your thinning over a few weeks, increasing your changes of thinning during good conditions.

In conclusions, to be profitable, particularly in the wholesale market, you must produce large apples, even at the expense of yield.



The relationship among relative yield, fruit size, and net returns.

UMass Extension Factsheet F-117

Issued by University of Massachusetts Extension, Robert G. Helgesen, Director, in furtherance of the acts of May 8 and June 30, 1914.
University of Massachusetts Extension offers equal opportunity in programs and employment. F-117:5/95-500