

Comparison of Costs and Returns to Establish and Produce Specialty Pears on High Density Plantings with Sleeping Eye Trees and Standard Trees with Standard Planting Lake and Mendocino Counties – 2006

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The cost and returns for specialty pears established on high density plantings using sleeping eye trees (one year rootstock delivered with two dormant buds), high density plantings using standard (2-year-old grafted) trees, and standard planting using standard trees are compared. The expected yields for the high density plantings are based on data from a Golden Russet Bosc training/rootstock trial in Lake County from 1996 - 2005. The costs of production are based on high density planting data from other crops with similar type plantings, and are not based on data from any actual high density pear farming operations. This summary will highlight the differences in costs and returns among the three systems. The complete studies can be downloaded from the website <http://coststudies.ucdavis.edu>.

Trees. No specific cultivar is planted in this study but might include Bosc, Comice, Seckel and Starkrimson. The high density trees are planted on 5 foot by 14 foot spacing (tree spacing X row spacing) in double rows for a total of 1,244 trees per acre. Trees to be trained on one side of the trellis alternate with those on the other side. The standard planting is 10 foot X 18 foot for a total of 242 trees per acre. In all cases the orchard life is assumed to be 30 years. The studies use a cost of \$6.40 each for the standard trees and \$2.50 each for the sleeping eye trees.

Trellis. The high density trees are trained on an Open Tatura trellis system. The open V trellis is at a 30 degree angle with trees in each row planted inside of each side of the trellis row (double rows) and maintained at an eight foot height (the trellis angle can be narrower, 22.5 or 17.5 to the vertical). A three foot bamboo stake is placed by each tree to support it for the sleeping eye trees.

Total Planting Costs. The land preparation is assumed to be the same for all three systems. The total planting costs include removal of the old orchard, fumigation, land preparation, layout, trellis, planting, and trees. The standard / standard system has the lowest planting cost because of the lower number of trees and because there is no trellis. The high density/ sleeping eye costs less than the high density/standard trees solely due to the difference in the cost of the trees (Table 1).

Table 1. Comparison of planting density and costs

Spacing	Tree Type	Trees per Acre	Tree cost per Acre	Trellis Open V	Total Planting Cost per Acre
High density	Sleeping eye	1,244	\$3,110	\$1,700	\$8,882
High density	Standard	1,244	\$7,962	\$1,700	\$13,550
Standard	Standard	242	\$1,549	---	\$5,374

Cultural costs during establishment years. The pest management, irrigation, and fertility programs are almost identical for all systems (although theoretically pest management costs should be lower in the high density trees due to their shorter height). The only significant difference is pruning costs in all years. From the fourth year on the pruning costs for the high density system is \$1,072 per acre and only \$772 per acre for the standard density.

Yields and returns. The yields for the standard density orchard are assumed to be 20 tons per acre with 20 percent culls or 16 tons fresh fruit and 4 tons going to processing. The high density yields for a mature orchard are assumed to be 25 tons per acre with a ten percent cull rate or 22.5 tons fresh fruit and 2.5 tons for byproduct. The sleeping eye trees come into bearing more slowly than the standard trees and the high density come into bearing more slowly than the standard density (Figure 1). For our analysis we used a price of \$700 per ton for fresh fruit and \$20 per ton for processed fruit before packing and processing charges are deducted.

Harvest costs for standard planting. Mature pear orchards are harvested twice. The first pick usually collects one third of the select fruit and the second pick is between 10 days and two weeks later. Harvest crews use ladders and picking bags to hand pick fruit that is placed into half ton bins. Tractors with bin trailers move the filled bins from the orchard and place them on a flatbed truck for transport to the packing shed. In our study the grower harvests and hauls the crop although custom harvest may be hired. Total harvest cost to pick and haul is estimated to be \$1,283 per acre or \$64 per ton at a 20 ton yield. Packing charges are an additional \$340 per ton including the cost to process culls. At the assumed yield of 20 tons per acres and 20 percent culls, the cost to pack is \$6,795 per acre for a total packing and harvest cost of \$8,078 per acre or \$404 per ton.

Harvest costs for high density plantings. Trees are also harvested twice beginning in August. Harvest crews pick from the ground using picking bags and place the fruit into half ton fields bins on bin trailers. The harvest cost is estimated to be \$1,166 per acre or \$47 per ton at a 25 ton per acre yield. The packing costs are an additional \$9,475 per acre or \$380 per ton at a 25 ton yield with ten percent culls. (The cost per ton for packing is higher for the high density fruit because the cull rate is lower and a higher percentage of fresh fruit is packed.) This results in a total cost per ton to harvest and pack of \$427 per ton.

Net returns above operating costs. Net returns above operating costs are calculated as the gross returns minus the sum of the cultural costs (pruning, irrigation, pest control, and fertilization), harvest costs, and packing costs. The results show that the net returns for the high density/standard trees is positive in year 6, for high density/sleeping eye in year 7, and for standard plantings in year 9 (Figure 2). More importantly, the net returns at full production are \$668 per acre for the standard planting and \$2,347 for the high density plantings due to the higher yields for the high density plantings and also the higher value per ton due to the lower cull rate.

Accumulated net returns above operating costs. The accumulated net returns are calculated by adding the net returns from all previous years to the current year. For example, the accumulated net returns in year four is the sum of the net returns from years one through four. This is equivalent to the amount you would have in a checking account without interest. The results show that the standard planting does not show an accumulated profit until year 21. Accumulated net returns are positive for the high density/standard trees in year 11 and in year 13 with sleeping eye trees (Figure 3). The accumulated net returns for any given year after maturity are about \$5,000 per acre higher for the high density with standard trees than with sleeping eye trees. But recall that the planting costs with sleeping eye trees cost \$4,668 per acre less than the standard trees (Table 1). Therefore, the investments are quite similar.

Figure 1. Expected yields per acre for high density and standard plantings

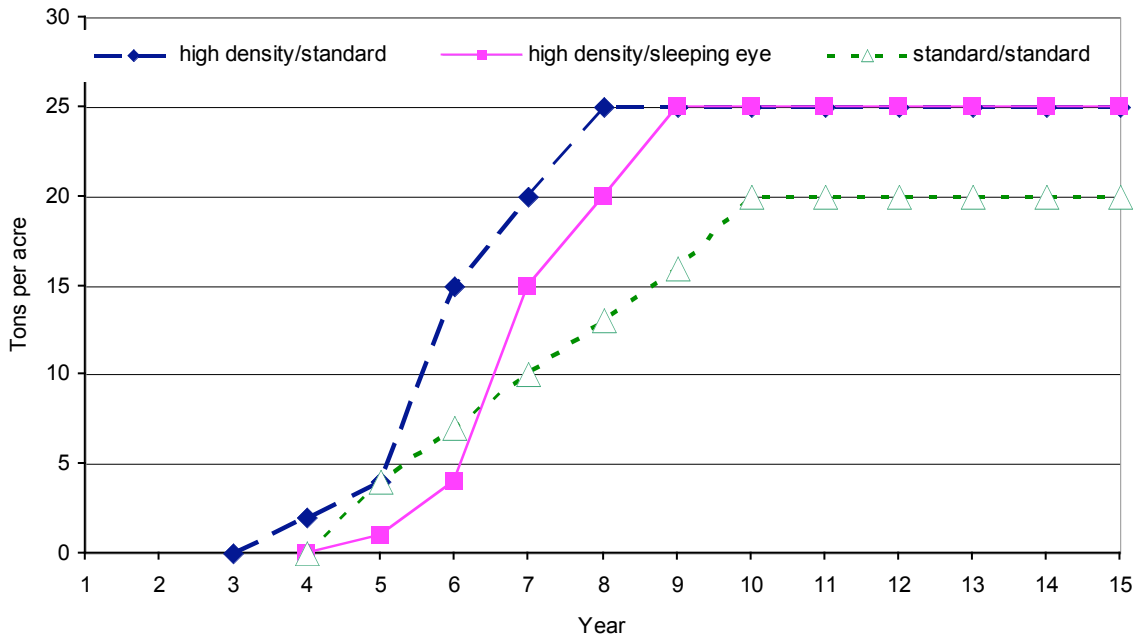


Figure 2. Net returns above operating costs per acre

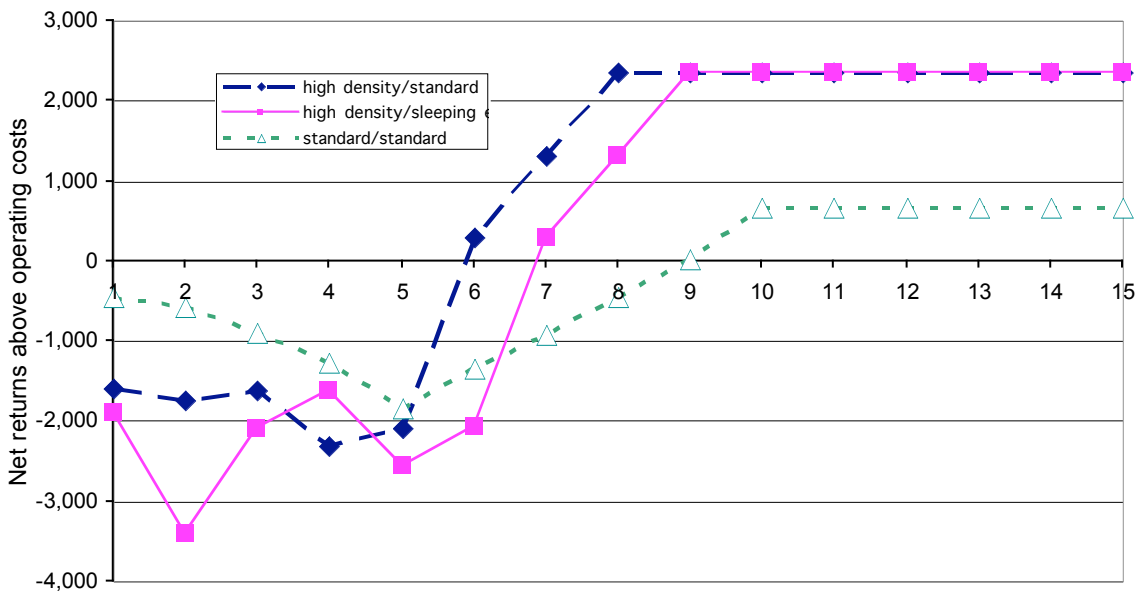


Figure 3. Accumulated net returns above operating costs for high density and standard plantings

