Effective Use of Pea and Bean Transplants for Earlier and Greater Yields

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We have a small, diversified, family farm which we have grown vegetables on with organic methods for 23 years in upstate New York, zone 4. We raise over 40 types of vegetables and fruits which we sell year-round at farmers' markets, and this diversity gives us our stable income. Every year, some crops fail or don't do well, and over the years, we have looked to find techniques to improve the production of many, including peas and beans.

As we managed our soils over the years and increased their organic matter percentage, the earthworm population increased as well, and we soon discovered that the pea seeds we direct planted in the early spring were being eaten by all these wonderful worms! We could only grow the peas on the newly acquired fields where there were not so many earthworms, but the rotations became challenging. We had been transplanting beans already, and discovered the system worked well for peas also. In determining if the extra time to transplant them was profitable, we had to analyze the crop.

Some of our management decisions to decide what to grow or systems to use for individual crops are made by a "hunch", but many are based on the records that we keep on our farm. Record keeping is very valuable for running a farm business. Maintaining very simple records works well in our farming system and it requires minimal time outlay. We keep field seeding records in a notebook and what is listed are: date of seeding or transplanting, variety, row footage, and spacing. From these few numbers, the square footage of each crop grown can be calculated. For example, many of our crops are planted in beds which have 4 rows planted 14" apart and are 100 feet long and have two feet between beds; each of these beds is therefore 550 square feet. We also use a simple spreadsheet in a notebook in the washing station that is filled in each harvest day showing the product, quantity packed for the market (bunches, heads, pounds, etc), and the quantity that returns from the market. From those few numbers, a total quantity sold of each product can be determined at the end of the year, and therefore its total approximate value.

These simple records help us utilize an important rule that we employ in our management. The rule is what we call the "$20,000 per acre rule." What that means is that each crop is expected to have a minimum gross value of $20,000 per acre **if extrapolated out**. This calculation is determined by using our records that show the square footage of each crop that is grown on and the actual dollar value that each crop produced for the entire year. The extrapolation is necessary because we do not grow an acre of most crops and we need to have a system to compare them evenly. Planting most crops intensively in rows 14 inch on center is important to utilizing small acreage to its fullest extent on our farm. If a particular crop is not making us $20,000 per acre, then we must once again make a management decision on that crop to raise its value. Some of the options to accomplish this are by: improving our production and harvesting techniques; changing the variety; packaging or displaying it differently; increasing the price; or extending its growing season. Another option is to discontinue growing the crop, which we rarely do because that would reduce our diversity.

To give an example of how this rule has worked for us, we will examine pea production. In an average year (or an average over several years), our records showed the following:

SUGAR SNAP PEAS:

Income = 538 pints @$3/pt =$1,614

Field space = 2,700 square feet

Since 1 acre = 43,560 square feet, the actual acreage planted is 2,700/43,560 = .062 acre

Then to extrapolate to show the value of the crop for one acre: $2,152/.062 acre = $34,710 per acre

Using these same formulas and our records, the values of the other peas were:

SHELL PEAS: $13,700 per acre (at $4.00 per quart)

SNOW PEAS: $64,100 per acre (at $4.00 per pint)

We could see that sugar snap and snow peas had a good value (when they had high germinations), so they were worth the effort to transplant to get the production back up. We seed 2 seeds per cells in a 200 cell seedling tray, making sure they are pushed down in well under the soil mix. We grow them in the greenhouse for about 2 weeks until they have just enough roots to hold together when pulled out. Leaving them too long in the trays can be a real problem as they grow fast and can get stressed. Over the past 4 years, we have experimented with Biotello, a cornstarch based plastic that can be rototilled in at the end of the season. Our farm has never used any regular plastic. Our system of transplanting into the Biotello and having chopped straw or hay (clean) between the rows of Biotello has given us great advantages, not only for weed control, but also enabling us to transplant out on a better schedule since the Biotello can be laid ahead of time when the weather permits. The pea plants are hand transplanted into the 4' wide Biotello in 2 rows with the plants spaced about 3" apart in-row, packing them in as close as possible. If the variety is a climbing type (Sugar Snap), the 2 rows are planted about 12 inches apart, then the Hortinova fencing can be put between them and the peas climb up from both sides. If they are bush types, we spread the 2 rows out to the 2 edges of the Biotello to increase air circulation and make harvesting easier.

We start the peas when we know we will be able to get on the field and lay the Biotello within 2 weeks (hopefully late March or the first week of April), then we will rowcover them after transplanting. We typically do 3 successive sowings of Sugar Ann snap pea and Oregon Giant snow pea, our favorite varieties, and one planting of Sugar Snap, which is trellised and produces longer. These seedings are spaced 7 to 10 days apart. We also do a few shell peas, but they are grown mostly for us to freeze and enjoy; their value is not as high per square foot so production is kept limited and the other varieties are maxed out to increase profitability.

Similarly, we start some of our beans in the greenhouse, then transplant them outside or into our high tunnels. The first beans are started in late April in 50 or 72 cell Winstrip trays, 2 seeds per cell, with Jade and Provider typically the varieties we use. After about 3 to 4 weeks, these first ones are transplanted into our high tunnel in rows 12" apart and plants 3 to 4" apart in row. By transplanting, the previous winter/spring crop can produce an extra 3 to 4 weeks while the plants grow in the greenhouse, thereby increasing productivity in the tunnel. This also gives us very uniform stands of beans and earlier production. Rowcovers are used on all the early spring crops, like beans and peas. If greenhouse space permits, successive sowings can we started for transplanting out to the fields, with our standard bed format of 4 rows 14" apart being used and the transplants being placed about 3 to 4" apart. The water-wheel transplanter is not used on the beans as 6" is the closest setting we have, and we do a limited number of beans every other week. Transplanting also has the advantage of getting a jump on the weeds; a few timed cultivations with the Lely tine-weeder does a great job and the crop comes and goes before weeds have a chance. An inoculum is used on all pea and bean seeds at planting time, mixing a few drops of water onto the seeds, then having them dipped in the inoculum.

Transplanting of the peas and beans has helped increase our yields consistently each year due to finally getting uniform, full sections of the plants. Their production is also earlier as seeding in the greenhouse doesn't have all the restrictions that direct seeding does waiting for the soil to be in good condition to plant, and the Biotello for the peas also gives some extra heat to the soil in April/May. Finally, it saves us lots of money by not having repeated re-seedings due to the earthworms and lack of germination due to cold, wet soils and rotting peas.