

Innovative Strawberry Growing Ideas

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What are some of the newer ideas in strawberry production in the Northeast and Canada? Are they meeting with success?

Not Your Father's Matted Rows

Plasticulture Strawberries

Ohio growers are having success using plasticulture production systems for strawberries. They are growing June-bearers and day-neutrals on black plastic using a 2-row per bed system. The typical production cycle is 2 years.

NY growers continue to experiment with plasticulture strawberries – both June-bearers grown in perennial systems and day neutrals grown as annuals or on a 2 year cycle. These are both grown on traditional black or white plastic mulch or on biodegradable mulch. Not all attempts have been successful but much progress is being made. Fertility issues affecting fruit quality, varieties and production systems suitable for NY are still under investigation.

Both Quebec and Ontario are having excellent success with plasticulture production of day neutrals.

Annual production systems using day neutrals are established in June using dormant crowns, and harvested from June until frost. These plantings were initially carried over for a spring crop but berry size was small. To capture earliness without compromising fruit size, a second production system was adopted where fall plantings are established using plug plants. There is some risk associated with fall planting as plants not sufficiently established tend to be more prone to frost injury. Wind breaks and/or fencing is used to encourage snow accumulation to protect plants during the winter.

Fields for fall or spring planting are fumigated in late summer before being fitted with raised beds/plastic. This allows for the earliest spring planting. The beds are 4-ft wide and 10" high and are covered with black plastic mulch. Two drip tapes run down each row under the plastic. Plants are spaced 8" in row and 16" between rows on the plastic (20,000 plants/A). 'Seascape' is the variety under production in these systems. Fall planted plug plants are overhead watered 2 times a day in addition to trickle irrigation during the first 2 weeks after planting. This is especially critical during warm August weather. Pre-emergent applications of Chateau and Sinbar are made only in the 2.5' wide alleyway area between the beds to help avoid any potential injury to the transplants. Runners are removed weekly. Pest issues include Tarnished Plant Bug, Two-Spotted Spider Mites, Powdery Mildew and Gray Mold. Harvest begins in early June; berries are picked every 2 days while they are bearing.

More information:

1. Dale, A. and Pritts, M. 1989. Day neutral Strawberries. <http://www.omafr.gov.on.ca/english/crops/facts/89-099.htm>
2. Nourse, Nate. 2012. Plasticulture 2012: June-bearing and Everbearing Strawberry Production with Dormant Plants. http://noursefarms.com/assets/2012-4_plastic.pdf
3. Poling, B., Krewer, K., and Powell Smith, J. 2005. Southeast Regional Strawberry Plasticulture Production Guide. <http://www.smallfruits.org/SmallFruitsRegGuide/Guides/2005culturalguidepart1bs1.pdf>

Hydroponic Strawberries

Interest in hydroponic strawberry production is growing in NY and across the Northeast. Both commercially available and owner/operator designed systems are currently in use in the field and under protected production in high tunnels.

Stackers - Commercial systems like hydrostackers are popular. The typical field stacker operation is a ¼ acre plot with 15,000 plants growing in an artificial potting medium. Each “stack” has 5 Styrofoam planting units that hold 4 plants each. These are assembled in rows with weed barrier below. Automated irrigation/fertilization/pesticide application systems are in place at the top and mid-level of each row of plants. Varieties under production include ‘Seascape’ and ‘Albion’. Berries are typically harvested from mid-June to late October. Most operations are U-pick. Berry stems are cut with scissors allowing berries to drop gently into baskets (both scissors and baskets with liners provided). Alternatively, they may be purchased pre-picked from the farm stand. Some growers also sell at local farmers markets; berries not suitable for marketing as fresh fruit are often used to make value-added products also sold through the farm stand. Pest issues for this type of production system include American Robins, Gray Mold, Powdery Mildew, Tarnished Plant Bug, Leaf rollers/Skeletonizers and Two-Spotted Spider Mites. Vertical growing systems are also being used in commercial and DIY high tunnels. Pest issues here are minor compared to field production and chiefly include Two-Spotted Spider Mites and Powdery Mildew. *More information:* Hydro-Stacker Vertical Hydroponic Growing Systems - <http://www.hydrostacker.com/> and Verti-gro - <http://vertigro.com/>.

DIY Hydroponic Systems - One enterprising NY grower designed and built his own hydroponic system and has used it successfully with both tomatoes and strawberries. Using lengths of square PVC pipe he plumbed an 8-row system in his high tunnel. 4 inch diameter holes were drilled at evenly spaced intervals along the pipe. Pipes are connected using T’s. Dormant strawberry plants were planted in 4 inch open mesh weave pots filled with pebbles. These are set into the hole in the pipes. Water and nutrients are circulated through the system on a regular basis.

High Tunnel Strawberries

Day Neutrals - The season extension aspect of day neutrals is magnified when grown in a tunnel. Additionally, strawberries can fill valuable space where other crops would simply not fit. If they are treated as annuals, they just go into a regular rotation with other veg crops. Several production schemes are in use, including traditional matted rows, plasticulture, soil socks, hydroponics, etc. *More information:* Jett, L. 2006. Growing Strawberries in High Tunnels in Missouri. http://www.hightunnels.org/PDF/Growing_Strawberries_in_High_Tunnels.pdf; Rowley, D., Black, B., and Drost, D. 2010. High Tunnel Strawberry production. http://extension.usu.edu/files/publications/publication/Horticulture_HighTunnels_2010-01pr.pdf.

Not Your Mother’s June-bearers

Day Neutral Strawberries

Unlike their June-bearing cousins that fruit once a season, day neutral strawberries flower and fruit continuously (for the most part) from mid-June until frost. They may be grown either in traditional matted row systems or in plasticulture or hydroponic systems. The first commercial day neutral strawberry varieties were released in the early 1980’s by the Maryland Agricultural Experiment Station in conjunction with USDA-ARS. These were ‘Tribute’ and ‘Tristar’. Other releases followed from the University of California Davis Breeding program, including ‘Seascape’ (1991) and ‘Albion (2004)’ which are the mainstays of day neutral production in the

Northeast. ‘Other new day neutral releases from the UC Davis breeding program (‘Monterey’, ‘Pacific’, ‘Palomar’, ‘Portola’, and ‘San Andreas’, 2009) have not been fully evaluated under NE growing conditions. One eastern NY grower who has trialed Portola and Monterey reports Portola looks to have the MOST promise, although Monterey is also good, but a bit late and not enough yield. Portola kept going even when Seascape petered out a bit.

You may also be asked information about growing cuttings and planting in the summer (Chandler) simply because many small growers in New England and eastern NY have such high value markets and are selling produce all winter long. Those very early season berries really bring a LOT of money and are worth just putting in a bit so that they can capitalize on them.

Alpine Strawberries

Alpine strawberries (*Fragaria vesca*) are a gourmet type strawberry also known as “Fraises des bois” (woods strawberries). They have recently come back under consideration as a potential commercial strawberry crop for sale to gourmet market outlets such as high end restaurants.

They are available in red, white or yellow fruited open pollinated varieties. Fruits are small but highly fragrant. These berries are labor intensive in terms of harvesting. *More information:*

Wellik, M. Growing Gourmet Strawberries Commercially.

<http://www.thestrawberrystore.com/GrowingGourmetStrawberriesCommercially.pdf>

Other Bright Ideas...

Strawberries on Raised Beds

Growers in western NY often have rocky heavy clay soils to deal with. Strawberry production is problematic for these growers because of drainage issues and root rot diseases. One commercial berry operation has gone exclusively to raised bed production for strawberries. This system, in conjunction with the use of resistant varieties, has made commercial strawberry production possible and profitable for their operation.

The next 2 bright ideas attempt to address weed control during the establishment year of perennial matted row strawberries while reducing cultivation and herbicide inputs and improving soil health.

No-till/Zone-till Strawberries

A 2009 Cornell University project focused on controlling weeds in strawberries during the establishment year by transplanting dormant berry plants into a killed cover crop (Winter rye, *S. cereale*, 80 lb/A). Results from this project indicated this technique showed great promise but revealed a significant barrier. Most growers had difficulty planting through the killed cover crop. This resulted in slower establishment during the first month and caused skips.

Another related Cornell project nearing completion compares no-till, zone till and conventional tillage strawberry production. An Unverferth ripper/stripper was used to create a 6” tilled zone in the cover crop and the berries were planted in that zone. Its sub-soiler loosens soil deeply followed by coulters and a rolling basket that prepare a 6-10” wide seedbed. This technique allows the longer rooted strawberry plant to be correctly planted while still having minimum soil disturbance between the rows. By only tilling this narrow area, the chance of new weed seeds being brought to the surface for germination is reduced. Because the strawberry plants will get off to a good start, they should out-compete weed competitors in the tilled zone. The addition of the shank allows for improved water drainage therefore reducing disease pressure from soil borne diseases like Phytophthora fruit rot. The use of reduced tillage tools usually requires a

single trip across a field for it to be fitted for planting – an important advantage that translates into less labor, reduced fuel consumption and a decreased risk of soil compaction.

Strawberries and Biofilm

Biotelo mulch film was used in Cornell research and demonstration trials on grower strawberry farms for planting year weed management trials. This mulch is made of Mater-Bi, a thermoplastic material mainly derived from corn starch. The mulch is certified compostable and is IFOAM approved for use by European organic farms. Novamont, the maker, has not yet pursued approval for use in U.S. organic systems. The MaterBi mulch is an embossed mulch film manufactured using the same technologies used to produce conventional plastic mulch film. Mater-Bi's physical and chemical properties are similar to those of traditional plastics, but Mater-Bi mulches biodegrade at a rate similar to pure cellulose. Biofilms degrade as soon as they are stretched during field application and continue to break down in soil after incorporation. For the demonstrations, we used a .6 mil Biotelo mulch film. The rolls were 48" wide and 5000' long. As of November 2008, the cost is \$400/roll.

Biofilm decomposes more quickly when applied to soils with high organic matter content, so growers with plantings on sandy soil thought breakdown was slow. One Long Island grower in particular saw very little decomposition after 16 weeks. This is a problem as strawberry runners could not root through the intact biofilm. Growers with more organic soils were happier with the rate of decomposition and the degree of weed suppression. These growers reported that they did not need additional in-row herbicides, tilling, or hand labor during the first year growing season. Further, they felt that the berries grown on biofilm were more vigorous than the conventional matted row plant. *Sources of Biofilm:* Biobag USA, www.biobagusa.com, 1-800-959-2247 or Dubois Agrinovation, www.DuboisAg.com, 1-800-667-6279.

Strawberries and Bird Netting

One last comment on a probable production change is netting for birds in strawberries. Bird damage in strawberries was a HUGE concern this year in the Northeast region, and many growers are planning on netting strawberries in 2012. Remember, the scale of the planting is so much smaller in this area, that this type of intervention is not unreasonable for the value of the crop.