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STRAWBERRY PRODUCTION SUMMARY – 2007

Strawberry Varieties

The following are the varieties recommended for New York State. Standard, tried and true varieties are underlined. Other varieties are either older varieties that may not perform as well under New York conditions, or they are new (*)varieties that look promising but we don't have years of experience on which to base a solid recommendation. Try them at your discretion.

Table 1. Recommended strawberry varieties.

Early Season	**Mid-Season**	**Late Season**	**Day Neutral**
Earliglow	Brunswick	Allstar	Everest
Honeoye	Cavendish	Cabot	Seascape
Northeaster	Darselect	Clancy	Tribute
Sable	Kent	Jewel	Tristar
Itasca	Mesabi	Ovation	
	L'Amour	Sapphire	
	Serenity	Seneca	
		Winona	

(A detailed description of varieties found at the end of the production summary)

Planting Systems

Strawberries are grown under many different systems throughout the country. These include matted rows, annual plasticulture, ribbon rows and waiting beds. In addition, day neutral strawberries are produced on a limited basis. The annual plasticulture and waiting bed systems may indeed find a place in New York for June strawberries, but for the moment, we feel that the matted row is the most commonly used. For this reason, the following discussion pertains to matted row production systems only. Complete discussions on these other systems can be found in the Strawberry Production Guide (NRAES-88).

Preplant and Planting Year Considerations- Matted Rows

1. **Site Selection:** Site selection affects not only potential yield, but also marketing options. Consider proximity to market as well as site characteristics when chossing a site for your strabwery planting.

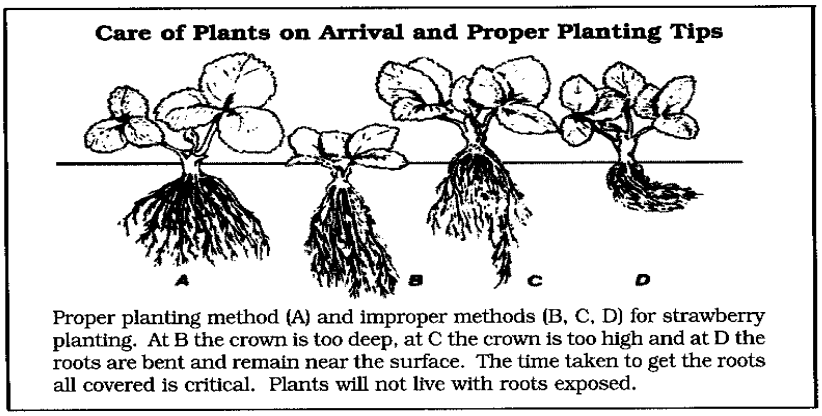
Table 2. Checklist for strawberry site selection.

√	Location close to market.
√	No strawberries grown on site for last 3-5 years.
√	Good soils (well-drained sandy loam, pH 6.0 to 6.5 best)
√	Good soil drainage
√	Moderate slope (3 to 5%).
√	Ample supply of high-quality water.

2. **Preplant preparation:** Weed management is a major problem for strawberry growers. Excellent preplant preparation with the goal of minimizing weed populations is essential. Eliminate before planting – it's much easier than after planting. Begin site preparation 2-3 years before planting. Use crop rotation, then a broad-spectrum post-emergent herbicide followed by a cover crop the summer before planting to get a head start on weed control. For more information

on site preparation and cover crops for strawberries see "Strawberry Production Guide for the Northeast, Midwest and Eastern Canada" listed in the resources section of this summary.

3. **Planting:** Order only the best quality plants from a reputable nursery. For more information on small fruit nurseries, see the Cornell on line small fruit nursery guide at http://www.fruit.cornell.edu/Berries/nurseries/index.html. When the plants arrive, store them loosely wrapped in plastic at 28°F - 30°F until you are ready to plant. Before planting, trim the roots lightly to stimulate growth. Strawberries can be set at a spacing of 18" within the row and 3 to 4 feet between rows for the matted row system (7,260 - 9,680 plants/acre). More narrow rows are better than a fewer wider rows. Plant them to the same depth they were in the nursery. The soil should cover the roots, but should not cover the buds in the top of the crown.



Proper planting method (A) and improper methods (B, C, D) for strawberry planting. At B the crown is too deep, at C the crown is too high and at D the roots are bent and remain near the surface. The time taken to get the roots all covered is critical. Plants will not live with roots exposed.

4. **Irrigation:** An irrigation system is a must for consistent strawberry production in the Northeast. Strawberries need irrigation for three things: (1) plant establishment and growth; (2) frost control; and, (3) evaporative fruit cooling during hot weather. An overhead sprinkler system can do all three. Rotating, impact driven sprinklers are the most common. However, berries will perform best with both an overhead and drip irrigation system. Drip irrigation delivers water right to the roots of the crop. This type of irrigation helps to minimize water loss through evaporation, disease development on wet foliage, and between row weed development. Overhead irrigation provides frost protection and evaporative cooling during hot weather. Strawberries need 1" of water a week in May and June and 2" of water in July and August.

5. **Fertilizers:** Do not apply any granular fertilizer or unrotted manure for the first three weeks after planting since the concentrated nitrogen will burn the plants. A weak solution of water soluble starter fertilizer can be used in irrigation water. Three weeks after planting, sidedress with fertilizer containing 30 lbs/acre of actual N. This could be put on as 300 lbs of 10-10-10 or as 200 lbs of calcium nitrate if you've applied P and K before planting. Although calcium nitrate is expensive, it has a low salt index and won't burn the newly established plants. Put on a second application of 30 lbs/acre actual N in early September. You can use 85 lbs of ammonium nitrate for this one.

6. **Planting year weed control:** During the first year hand weeding, hoeing, and cultivation are necessary. Herbicides should be selected on a basis of particular weed problems, for example, pre-emergent, grasses, post emergent, and broad-leafed weed control. There are very few herbicides available for the planting year. Devrinol 50DF at 4 lbs/acre is the best option. Devrinol is a preemergent herbicide labeled for germinating annual weed control. Apply 2—2.5 lb/acre a.i. in newly planted strawberry beds.

Sinbar® on Strawberries

Traditional Use: Sinbar at 2 to 6 oz/acre can be used once the plants have been growing for 6 months or more. Sinbar is a preemergent herbicide and kills germinating weeds. If it gets on strawberry leaves, it should be washed off immediately with irrigation. Sinbar is hot, and should not be used on soils with less than 2% organic matter or on sensitive varieties like Guardian, Micmac, Darrow, Tribute or Tristar.

Supplemental Label Use:

Planting Year: Apply 2 to 3 ounces of Sinbar® per acre after transplanting but before new runner plants start to root. If strawberry transplants are allowed to develop new foliage prior to Sinbar® application, the application must be followed immediately by 0.5 to 1 inch of irrigation or rainfall to wash the Sinbar® off the strawberry foliage. Otherwise unacceptable (severe) injury may result. To extend weed control through harvest of the following year, apply 2 to 4 ounces Sinbar® per acre just prior to mulching in the late fall.

Harvest Years: After post-harvest renovation, before new growth begins in midsummer, apply 4 to 8 ounces of Sinbar® per acre. To extend weed control through harvest of the following year, apply 4 to 8 ounces of Sinbar® per acre just prior to mulching in the late fall. Use no more than 8 oz. per year. [*Source:* Dr. Doug Doohan, OSU Extension Specialist, Horticulture and Crop Science]

Poast and Fusilade are post-emergent grass herbicides that have to go on when grass weeds fit in a control window (see label). Fusilade can go on when grasses are between 2" and 8" in the spring and can only be used during the first year (non-bearing).

Poast must be used on actively growing grasses. Higher rates of Poast will suppress quackgrass.

Poast can be used in the spring when grasses are around 6 inches tall. However, Poast cannot be used within 6 weeks after Sinbar applications. Do not mix Poast with other chemicals, and no more than 2½ pints/acre/season of Poast can be applied.

Devrinol at the full 8 lbs/acre rate can't be used until adequate runners have established (in the fall). If nutsedge is a problem, Devrinol is a better choice than Sinbar. Rainfall is necessary for activation. If you are not interested in runners (because you're growing day neutrals or using the ribbon row system) then the full rate of Devrinol can be used earlier.

Stinger can be used for specific broadleaf weeds, provides good control for thistle. May be applied to first year fields or established fields. DO NOT make application after planting, can cause herbicide damage. Wait until runners have rooted. In established fields, apply after last picking or in early spring, but 30 days before harvest. For thistle control apply early spring or later in the summer after seed dispersal. DO NOT tank mix. DO NOT apply within 6-8 hours of expected rainfall or irrigation. Apply 1/3 to 2/3 pints to 20-75 galllons of water per acre. Making 1-2 appplications per year without exceeding 2/3 pints per acre per year.

7. **Blossom removal during planting year:** All flowering stalks should be removed as soon as they appear. This lets the plants divert their energy into producing crowns and runners.

8. **Insect and disease control during the planting year:** Not much is required in the planting year. Keep the plants healthy with proper irrigation, fertilization and weed control. Leaf diseases like powdery mildew and leaf spot may be noticeable later in the year, but there is very little a grower can do to eliminate these diseases. Twospotted spider mites sometimes need attention. Look on the undersides of the most succulent leaves in the driest parts of the field. Use a hand lens to see this pest. If you see 5 mites/leaf, or if 30 out of 60 mature leaves are infested, action is suggested. If a miticide is applied, make sure you acheive good coverage on the underside of leaves. Later in the summer (June to early July), potato leafhopper may be a problem. This pest migrates in from the south. Nymphs and adults feed on leaf juices causing very characteristic, V-shaped "hopper burn". Disturb the strawberry foliage. If you see large numbers of these insects flying off the foliage, control may be warranted. Use Sevin for this pest.

9. **Setting runners:** One of the biggest problems with the matted row system is that too many plants are produced. These plants compete with each other for light and water and actually act like weeds to reduce yields next year. For best results, keep rows narrow.

10. **Mulching:** Strawberries need mulch to survive winter lows, fluctuating temperatures and soil heaving. To apply a 2" to 4" layer of mulch 2.5 to 5 tons (125 to 250 forty pound bales) per acre are required. Clean wheat, oats or rye straw is best, although any material that doesn't compact can be used.

11. Put down the mulch around Thanksgiving after several freezes in the high 20°Fs or low 30°Fs occur during the same week.

Matted Rows During Fruiting Years

1. **Remove the mulch:** This can be done with a hay rake in late March or early April. Alternately, you could remove the mulch in mid March, and replace it with a spun-bonded row cover. Generally March is an appropriate time to remove protective winter straw mulch and apply a row cover. Studies show when mulch is left on too long; strawberries can be damaged more easily in fluctuating temperatures. Synthetic row covers can improve photosynthetic rates, accelerate plant development, increase starch accumulations, and increase fruit yields. Rowcovers should be removed after flowers have been observed. This will get the plants growing and give you fruit 10 days earlier than normal. Good frost protection is essential if you decide to do this.

2. Frost protection: Strawberry flowers are injured at temperatures less than 28ºF. When the temperature starts dropping into the freezing range in the spring, flowers must be protected with irrigation. As long as water is actually freezing, it releases enough heat to protect the flowers. Keep the sprinklers on until the ice starts to melt from the heat of the morning.

The following table gives inches of water per hour to apply at wind speed (in MPH) at the crop height, at 50% relative humidity. One acre inch equals 27,154 gallons of water.

Table 3. Frost protection in strawberry – Amount of water to apply.

	At 50% Relative Humidity Wind speed (MPH) at crop height			
Air temp (F) at canopy	0-1	2-4	5-8	10-14
27	0.10	0.20	0.30	0.40
24	0.10	0.30	0.35	0.45
20	0.15	0.35	0.45	0.60
18	0.20	0.40	0.50	0.65

(Source: FROSTPRO application rate model; Perry, NC State University, in OHIO ICM report, by Ferree and Miller)

1. **Early season insect and disease control:** Strawberry clippers (bud weevils) are an insect pest that overwinters in the leaf litter along hedgerows and in the woods as adults. They become active in late April and early May when temperatures are above 65°F. They move to the nearest pollen source (strawberry buds), where they feed. The female lays an egg into the bud, then "clips" the bud to protect the larva by preventing the bud from opening. Watch for clippers when flower buds start coming out of the crown and the temperatures approach 65°F. Refer to Cornell Pest Management Guidelines for thresholds and susceptible varieties.

Two spotted spider mites and leaf spot and leaf scorch are other things that generally don't show up until later in the season. For mites, see comments for the planting year above. If mites were a problem in the past, avoid using Sevin or Kelthane, since these materials are hard on beneficials. Try Savey, Catamite, Zeal 1, or Agrimek. Read labels for specific recommendations for use of these products. Note: Zeal 1 and Savey are most active against egg and young immature stages and therefore need to be applied before populations reach damaging levels.

Recently, there has been an increase in cyclamen mite damage and infestations throughout New York State. To date there has been little research conducted to determine the economic threshold of cyclamen mite damage. However, if left untreated, cyclamen mites appear to reduce yields. These tiny mites are not visible to the naked eye. They appear pinkish – orange and shiny when mature. Translucent eggs appear in numbers along the midrib of leaf viens on young leaflets just unfolding. These mites feed on young leaves in plant corwns; when damaged they appear stunted, crinkled,and malformed. Cyclamen mites are most abundant in fields left in production for long periods of time. If this is a problem, be sure to rotate out of production. *Thionex 3EC (2.67qt/A) endosurflan, is registerd for control. Refer to the Cornell Pest Management Guidelines for specific application rates. Note to use a large amount of water, 200 gallons/acre, to insure coverage. Post renovation is a good time to acheive good coverage.

Leaf spot, leaf scorch and leaf blight are fungal diseases that affect the foliage. They may require attention on extremely susceptible varieties like Kent or Honeoye, or if disease incidence was high the year before. Leaf spot causes small, round spots that are purple with a white ring around them. Leaf scorch causes irregular purplish blotches on the leaves. Leaf blight causes either large V-shaped lesions that originate from the base of the petriole or discrete small to large spot with a tan-brownish interior surrounded by a purple halo. These spots can often be confused with leaf spot early on. These leaf

diseases can seriously reduce marketable yield if sepal infections occur. If there was severe leaf spot the previous year and if wet weather is in the forecast, apply Nova 40W, Cabrio EG or Captan 50WP in early spring.

4. Prebloom insect and disease control: Tarnished plant bug, TPB, is another serious insect pest of strawberries. TPB adults are easy to spot later in the summer, especially in weedy fields. They overwinter as adults and become active as temperatures rise in the spring. Often, adult populations are quite low in the spring due to high overwintering mortality. In more northern climates, the nymphs are actually what causes the most damage for June bearing cultivars. Nymphs are tiny and look somewhat like aphids (bright green), but they do not have cornicles ("knobs") on the rear of their bodies and are more active. You may need a hand lens to see them well. The nymphs and adults feed on flowers and fruit, causing knobby berries ("catfacing" or "button berries").

Although there are numerous natural enemies of TPB, insectcides are often necessary to prevent economic damage. If you are scouting for nymphs, tap flower cluster/fruit clusters over a white saucer. If you find 0.5 nymph per cluster (when several samples are averaged together) the action threshold has been reached and a spray is necessary. There are a number of chemical options. There are also non-chemical controls of TPB that are part of a complete control program. These include selecting early varieties and using rowcovers. Also, good weed management will help with TPB problems. Productive cultivars like Honeoye appear to be tolerant to TPB feeding.

Spittlebug is another insect pest that may require action at this time or as the season progresses. Spittlebugs usually do not affect strawberry growth or yield, but the nymphs produce a foamy mass that pickers object to. In April or May, look for the yellow or green nymphs of spittlebugs between the folds of young, unopened leaves. If in past years you've had more spittlebug masses on your plants than you can live with, this is the time to spray. Several products are labeled for spittlebug. See Cornell Pest Management Guidelines for formulations and rates.

5. Early bloom insect and disease control: Gray mold (*Botrytis* fruit rot) is a fungal disease of strawberries endemic to New York. The fungus overwinters in leaf litter and newly-formed spores infect the senescent flower parts. When the fruit ripens, the fungus, quiescent in unripe berries, sporulates and covers the fruit with a fuzzy gray spore mass. Because the fungus infects plants during bloom, fungicides are applied at this time. Captevate 69WDG and Switch are two good choices for fungicides, however there are many options, see Cornell Pest Managemnet Guidelines for futher choices. Some fungicides applied for gray mold will also control leaf spot and leaf scorch.

Fungicides are only part of the control strategy for gray mold. Cultural practices are even more important. Growers who plant narrow rows and manage weeds do not have to apply fungicides for gray mold. Culutral practices that promote rapid leaf drying are aslo of key importance. This includes avoiding irrigating to extend a dew and avoiding planting near woods and hedgerows where air movement is low. Also, do not over fertilize with nitrogen, since this promotes rapid, succulent suceptible growth.

Around this time of year start watching for root rot diseases like red stele, especially in wet spots, heavy soils, or in susceptible varieties. This disease is caused by an aquatic mircoorganism Phytophthora fragariae, which requires free water to spread and infect. Plant roots will have a brick red core when cut open. If you see these symptoms, a Ridomil Gold EC or a Phostrol application may be required in September (See the *Cornell Pest Management Guidelines for Berry Crops*).

6. **Bloom insect and disease control:** If you are using fungicides to control gray mold, put on a second application, but at least10 days after the last application. Continue with fungicides on a calender schedule for gray mold if wet weather occurs after bloom. This is the most important time to apply fungicides. Due to toxicity to honeybees, using insecticdes during bloom is not recommended.

7. Fruit set through harvest insect and disease control: Continue with fungicides for gray mold if necessary. To avoid building resistance to certain materials, rotate between fungicdes using different modes of action. Tarnished plant bug may need control. Malathion is most commonly used, although several are listed. Also, keep an eye out for spider mites.

Adult Root Weevils emerge from the soil during this time (mid-June to July). The adults feed at night on foliage, creating characteristic notches on leaves. The adults feed for several weeks before commencing to lay eggs. Although leaf feeding by adults this is not economically significant (larval feeding on roots is a much more serious threat) this is the life stage of the insect to target for chemical control. Both Danitol and Brigade are registered for root weevil and tarnished plant bug

control. Entomopathic nematodes (nematodes that prey on insects in the soil) have also been effective in reducing root weevil populations. Apply either in the early spring or fall.

8. Post harvest insect control: Strawberry root weevil causes damage when the grubs feed on plant roots. Look for the grubs on the roots of unhealthy looking plants from May to July. Severely infested fields should be plowed down soon after harvest and rotated away from strawberries to break the cycle.

9. Sap Beetle: Strawberry Sap Beetle has been creeping into our fields more and more lately and some growers in New York State say that it is their worst pest on strawberries now. Adult Sap beetles make cavities in ripe fruit and larvae follow later. Often these cavities are not discovered when picking and many sap beetles may emerge from the fruit as its being washed or later processed. Brigade and Danitol are labeled for control of the adults. Note that the adults overwinter outside of strawberry fields and only move into the fields when the first fruit begins to ripen. Hence, insectcides applied prior to this time will have minimal impact on strawberry sap beetle. Also note that Brigade has 0 days to harvest restrictions.

10. **Renovation:** After harvest, fields should be renovated as soon as possible. The process of renovation is rejuevenation. Renovation goes a long way towards controlling diseases and stimulating growth in the plants. The steps in renovation are:

1. Apply 2,4-D (Formula 40) at 2-3 pts/acre for broadleaf weed control. This should go on 4 - 5 days before mowing to give the herbicide a chance to be translocated to the roots. 2,4-D shouldn't be applied after August 1 because it interferes with next year's flower bud initiation. There is another opportunity to apply 2,4-D in the fall once the strawberries go dormant.
2. Mow leaves off close to the ground, but without damaging the crowns.
3. Narrow the rows to 10-12 inches with a rototiller. While doing this, try to throw 1/2" of soil onto the crowns.
4. Fertilize with 60-80 lbs of actual N. This can be done with 500 lbs/acre of a complete fertilizer like 15-15-15 or 750 lbs/acre of 10-10-10, but it's preferable to use ammonium nitrate since P and K were sufficient at planting.
5. Apply Sinbar herbicide to control germinating weeds. This can go on at 2 to 6 oz/acre, with another application later. The total cannot exceed 8 oz/acre per season. See cautions for this herbicide in PLANTING YEAR section.
6. Apply Stinger to control broadleaf weeds. DO NOT tank mix with other herbicides. This can go on 1/3 to 2/3 pints per acre, not exceeding 2/3 per acre per year. See Precautions in PLANTING YEAR section.
7. Irrigate to incorporate fertilizer and herbicide.
8. Take leaf samples for analysis. Collect at least 20 of the first fully expanded leaves that regrow after renovation. Contact Cooperative Extension for instructions on submitting them for analysis (cost is approximately $28 per sample). Put on another application of fertilizer during the first week in September according to the leaf analysis. If no leaf analysis was done, apply another 30 lbs/acre of actual N. This can go on as 90 lbs/acre of ammonium nitrate.

11. **Late summer chores:** Continue with good cultural practices to help the plants grow before fall. Keep rows narrow and control powdery mildew, leaf spot, and leaf scorch with fungicides as needed. Watch for potato leafhopper. Control it as suggested for the planting year. In fields where red stele was noticed earlier, apply Ridomil Gold EC or Phostrol in September. Use Ridomil Gold EC sparingly, because resistance can develop over time.

12. **Last step in the fall:** Prepare once again to mulch your strawberries. Before mulch is applied, a pre-emergent herbicide can be applied. Devrinol 50DF at 8 lbs/acre is one option, Sinbar 80WP as described before is another option. Most growers split their 8 lbs/acre into an early spring and fall application.

Notes on the Newer Chemicals

Abound 2.08F, **Cabrio EG**, and **Pristine** are now labeled for strawberries. These are strobilurin fungicides labeled for control of a number of diseases, including anthracnose of strawberry, strawberry leaf spot, and powdery mildew. These fungicides have several use restrictions due to resistance concerns (see labels). If there are apples nearby, avoid Abound all together. Even tank residues of Abound will cause severe phytotoxicity in “McIntosh” apples.

Captevate 68WDG is registered for use against gray mold and anthracnose. Captevate is a mixture of the fungicide fenhexamid (Elevate) and captan. Elevate is an excellent fungicide while captan has good activity against anthracnose and some activity against gray mold.

Quintec (Quinoxifen) was recently labeled (Nov 9, 2006) for strawberry powdery mildew in NY. This should be applied prior to infection/symptom development. Make no more than a maximum of four applications per season with no more than 24 fl. oz, per acre of crop per year. See the label for additional use requirements.

Brigade is a broad-spectrum insecticide and will kill both pest and beneficial arthropods. Use with caution. Frequent use may disrupt biological control of spider mites resulting in mite outbreaks. Remember to avoid using when bees are active. In New York, growers are not allowed to apply Brigade within 100 feet (using ground equipment) of coastal marshes or streams that drain into coastal marshes. A number of insects are on the label including sap beetle and strawberry root weevil. The REI is 24 hr and the DTH is 0 days.

Danitol controls Lygus bug, spittle bug, tarnish plant bug, sap beetle, two spotted spider mites, clipper or root weevils. 2 days to harvest.

Savey: is soft on beneficials. Best when used before populations reach high levels.

Sinbar® on First Year Strawberries: The DuPont Crop Protection Company has issued a supplemental label allowing for the use of Sinbar® on first year strawberries. *(See page 3).*

Switch: 62.5% WG fungicide is registered for control of Botrytis fruit rot and has provided excellent disease control in NY fungicide evaluations. Research in Florida indicates that it provides some level of control for Anthracnose fruit rot. To use Switch most effectively for control of Botrytis, it should be applied at the rate of 11 to 14 oz/acre on a 7 to 10 day interval through bloom. It is important to maintain good coverage throughout bloom. Do not apply more than 56 ounces of product per acre per year (4 applications at the maximum rate). See the label for additional use requirements.

Change in Guthion Label: Guthion has been revised, to modify the Personal Protective Equipment and extend the Re-Entry Interval (REI). If you are going to be in contact with plant material the REI is 4 days. If you will not be contacting plant material the REI is 48 hours. Days to Harvest (DTH) has also changed. Blueberries have a 7 DTH, Strawberries 5 DTH, and Raspberries 4 DTH. Be sure to read the label before any application.

In a Nutshell

March - April	Remove mulch, apply row cover, set up for frost protection
April - May	Scout for tarnished plant bug, apply blossom fungicides
June	Irrigate when needed
July	Renovate, fertilize, irrigate, do weed control
August	Leaf analysis
November	Preemergent weed control, mulch

Strawberry Varieties

Strawberries are probably the most variable and temperamental of the small fruits and also probably have the most cultivars to choose from because they are often adapted to a relatively small growing region. June-bearing types are most commonly grown in NY and the NE U.S., but interest is growing in day-neutral types grown on plastic. If you are looking to try a new cultivar, check out Darselect or Cabot or if you want to see the latest thing, NY1829 and NYUS304B are available in limited numbers.

Early Season

Earliglow is still considered the best tasting berry around. Primary berries are large, and attractive and are suitable for retail or wholesale. Berry size drops off quickly after the primary berries and yields are relatively low.

Honeoye has reigned as the yield king for many years and produces an abundance of large, attractive, firm berries that are suitable for all markets. Closer to an early mid season, the look of this berry sells it, but taste is the major drawback as it can be tart and can develop disagreeable aftertastes when over ripe or in heavy soils. It is susceptible to red stele disease but is manageable.

Northeaster was billed as a replacement for Earliglow and out performs it in all ways except flavor. Yield is higher and fruit size and attractiveness are equal to Earliglow but the flavor is unusual. The grape Kool-Aid like aftertaste can be a turn off to many customers.

Sable is earlier than Earliglow and is equal or better in flavor. Unfortunately it lacks size and firmness. This cultivar is only suitable for direct retail and u-pick operations. Frost damage can be a problem because the flowers open very early.

Itasca (MNUS 138, University of Minnesota) is a cross between Seneca and Allstar. It fruits early to early-midseason in Minnesota or early-midseason in Massachusetts. In Minnesota, fruit was larger than that of Annapolis, medium large in size, conic to blunt wedge shaped. Fruit flesh is orange-red with a classic flavor. Itasca is resistant to five races of red stele, and its foliage is highly resistant to mildew.

Mid Season

Brunswick is a new cultivar out of Nova Scotia that sizes and yields similar to Honeoye. However, it has a squat, round shape and tend to be dark and bruise easily. The flavor is good but can be tart when under ripe.

Cavendish is a high yielding, high quality berry in a good year. However, high temperatures during ripening can cause uneven ripening that can be a real problem.

Darselect is a large fruited, high yielding cultivar. The berries are an attractive bright red with a long conical shape. The flavor is very good. However, it tends to be soft. It is worth a look.

Kent produces medium sized berries with very good yield, especially in new plantings. Hot weather can cause skin toughness to deteriorate. It is very susceptible to leaf spot and scorch and to angular leaf spot. It is very sensitive to Sinbar herbicide. It does not do well in hot weather.

Mesabi is a very high yielding berry with large berries and good flavor, but does not store well. It is resistant to red stele and tolerant to leaf diseases and powdery mildew.

L'Amour (NY 1829) is a new cultivar from Cornell. It is an early mid-season type with excellent fruit quality. Berries are bright red and firm but not hard, with excellent eating quality and flavor. Fruit is long round, conical with a fancy calyx, which makes them a very appealing strawberry. Disease and insect resistance is unknown at this stage, but no significant problems have been noted to date.

Sapphire (University of Guelph, Ontario) is a late mid season variety with bright red and large. It is reported to be tolerant of the herbicide Sinbar (terbacil).

Late Season

Allstar is good yielding, high quality cultivar with good flavor. Unfortunately, the color is pale to orangish and is unacceptable to an uninformed consumer.

Cabot produces impressive berries. Average fruit size is far larger than any cultivar currently available. Primary berries often top 40 - 50 g. The color can be pale and primary berries are often irregular in shape. Secondary berries do not have this problem. Yields are very good. Resistant to red stele. Definitely worth a look.

Clancy (NYUS304B), is a new release from Cornell that was developed through a joint venture with the USDA breeding program in Beltsville, MD. It has parents that are resistant to red stele root rot. The fruit is a round conical shaped with darker red color and good flavor. The flesh is firm with good texture and eating quality. Insect and disease resistance is unknown at this time but no significant problems have been noted to date. Growers looking for a firm late season berry may want to try this one.

Jewel continues to be the favorite in this season. The high quality berries are large and attractive with good flavor. Yields are moderate. On a good site, it's hard to beat. It is susceptible to red stele and can have vigor problems in poor sites.

Ovation (USDA) is extremely late. It doesn't flower after most others are past their peak. Fruit quality is average but there is little to compare it to in its season. Yields are moderate.

Seneca is probably the firmest cultivar available for the northeast. The fruit is large, bright red and attractive but the flavor is only acceptable. It does not runner heavily and can be adapted to plasticulture.

Serenity (University of Guelph, Ontario) is a late season variety that is also tolerant to Sinbar (terbacil). The fruit is large and bright red. The skin tends to be soft. It reported to be moderately resistant to scorch and mildew.

Winona has very large berries and average yields but can not compete with Jewel for fruit appearance. It has good vigor though and might be useful where Jewel does poorly.

Day Neutral Strawberries

Everest is a fairly new cultivar out of the U.K. It has large, firm, bright red berries. It does not runner well and is only suited for plasticulture. Over wintering can be a problem with this one.

Seascape is a day neutral out of California that is seeing some success in the east. The fruit is large and very attractive. It is firm and good quality. It does not runner and is only suited for plasticulture. Over wintering can be a problem with this one.

Tribute and **Tristar** have been the standard day neutral cultivars for the northeast for the last 20 years. They are disease resistant, vigorous, and runner enough for matted row production. Both are relatively small fruited and low yielding but off-season fruit may pay off. Of the two, Tribute has better size and Tristar has better flavor.

New Cultivars (These have not been tested in Geneva but may be of interest.)

Evangeline this new cultivar from Nova Scotia ripens in the early season. The fruit is long conical in shape with a pronounced neck. The interior is white and it is susceptible to red stele. The fruiting laterals are stiff and upright which keeps the fruit off the ground and clean.

Sapphire is a late mid season cultivar from the U. of Guelph in Ontario. The fruit are bright red and large. It is reported to be tolerant of the herbicide Sinbar (terbacil).

Serenity is a late season cultivar that is also tolerant to Sinbar (terbacil). The fruit is large and bright red. The skin tends to be soft. It reported to be moderately resistant to scorch and mildew.

Saint-Pierre is a new cultivar out of Quebec. It has large conic shaped fruit that are pale red to orangish, much like Allstar. Fruit firmness and flavor are reported to be very good.

Elsanta (Netherlands) is one of the most widely planted cultivars in Europe. It is June bearing with high yield potential. Fruit is firm and aromatic. However, it is susceptible to red stele, anthracnose, and verticillium wilt.

Bish (Patent Pending) is a new cultivar from North Carolina State University. This cultivar is large and firm. It is resistant to anthracnose. It is a June bearing cultivar developed for use in plasticulture systems.

Avalon (Rutgers University, Plant Patent #11,372) is an early season berry with large fruit size. The fruit is rounder than Earliglow and somewhat dark. Flavor and firmness are very good. Plants are large and vigorous.

Educational Resources for Strawberry Growers – Print Publications

1. *Strawberry Production Guide for the Northeast, Midwest and Eastern Canada.* NRAES-88. $50. Available from our office (315) 963-7286. This is a comprehensive guide to strawberry growing, containing information on all aspects of production, budgeting and marketing. The guide contains 100 photos detailing insect and disease symptoms, nutrient deficiencies, herbicide injury symptoms and much more. This is a must for the serious strawberry grower. *Note from CCE Oswego County: The cost of the Strawberry Production Guide (NRAES-88) is $45 plus $5 postage. Contact NRAES (The Northeast Regional Agricultural Engineering Service) at (607) 255-7654 to place an order.*

2. *Cornell Pest Management Guidelines for Berry Crops* available from your extension office for around $18.

3. *Compendium of Strawberry Diseases*, 2nd edition. Published by the American Phytopathological Society, St. Paul, Minnesota. Call 1-800-328-7560 for ordering information. The price is around $37.

4. *Midwest Small Fruit Bulletin 861,* Published by Ohio State University Extension. For purchasing information contact Media Distribution Columbus, OH 614-292-1607.

5. *Strawberry IPM Scouting Procedures - A Guide to Sampling for Common Pests in New York State* Available through our office for $10. Instructional video available for rent or purchase, also available from our office.

6. *Dayneutral Strawberry Production Guide*, IB-215. $2. Available from our office (315) 963-7286.

Educational Resources for Strawberry Growers- Web-based Information

1. *Cornell Fruit Resources Page – Berry Section* - http://www.fruit.cornell.edu/berry.html. These pages include production and pest management information on the major small fruits including strawberry, blueberry, blackberry and raspberry, currants and gooseberries. Other specialty small fruit information is also provided. Also included are links to small fruit information from other Cornell and Non-Cornell sources. Pages featuring post harvest handling and marketing are also available.

2. *Cornell Pest Management Guidelines for Berry Crops* - http://ipmguidelines.org/BerryCrops/ . This is an on-line version of the print publication..

3. *Cornell Berry Diagnostic Tool* - http://www.hort.cornell.edu/department/faculty/pritts/BerryDoc/Berrydoc.htm .Dr. Marvin Pritts has done an excellent job developing a web-based diagnostic tool to help the grower/educator determine what might be wrong with their berry plants — from pest injury to herbicide injury to nutritional deficiencies. By answering a series of questions about symptomology, one is led to a possible cause. The site uses lots of photographs, so it can be a little slow with a modem.

4. *Cornell Small Fruit Nursery Guide* - http://www.fruit.cornell.edu/Berries/nurseries/index.html To find a source for a particular cultivar, go to the site, select a crop, find the cultivar of interest, note the nursery links, then click on those links for address, phone number, email addresse, web sites and FAX numbers, etc. for a particular nursery. This guide is updated annually.

5. *New York Berry News* http://www.nysaes.cornell.edu/pp/extension/tfabp/newslett.shtml. This is a monthly on line small fruit newsletter which covers all aspects of berry production. Available also in low resolution format for ease of downloading.

Educational Resources for Strawberry Growers- Grower organizations

1. *New York State Berry Growers Association*. Be sure to join this important political voice. Contact Jim Altemus at (716) 657-5328 or kconsult@allstream.net for more information. Visit their website at: http://www.hort.cornell.edu/grower/nybga/index.html .

2. *North American Strawberry Growers Association (NASGA).* A national organization with lots of memebr benefits. Contact Kevin Schooley at (613)-258-4587or kconsult@allstream.net for more information. Visit their website at: http://www.nasga.org/ .

This production summary is intended to be a brief overview of the steps involved in growing strawberries using the simplest and most economically conservative methods. Information on production systems, organic production methods, etc. can be found in detail in NRAES-88 " Strawberry Production Guide". Furthermore, to apply pesticides, you should consult the legal recommendations for your state as labels vary by state. In New York, the official source is the 2006 Pest Management Guidelines for Berry Crops ($18).

***Botrytis* fruit rot (gray mold)**
Gray mold, caused by *Botrytis cinerea*, affecting fruit in various stages of development.
Source: C. Heidenreich - Cornell University

Cyclamen mite damage on mature strawberry crowns.

Strawberry sap beetle
Adult strawberry sap beetle, *Stelidota geminata*.
Source: R. N. Williams

Meadow spittlebug nymph in a spittle mass.
Source: M. Zajac

Strawberry sap beetle larvae and adult