

This is a section from the

2016

Mid-Atlantic

Commercial Vegetable Production Recommendations

The manual, which is published annually, is NOT for home gardener use.

The full manual, containing recommendations specific to New Jersey, can be found on the Rutgers NJAES website in the Publications section
njaes.rutgers.edu

The label is a legally-binding contract between the user and the manufacturer.

The user must follow all rates and restrictions as per label directions.

The use of any pesticide inconsistent with the label directions is a violation of Federal law.

Applications of Uniform, Presidio, mefenoxam, or metalaxyl applied at seeding for root rot control will also help reduce chances for downy mildew development.

Leaf Spots (caused by *Cercospora*, *Alternaria*, or *Powdery mildew*)

Long periods of wet weather and driving rains which promote soil splashing are conducive for development. Thoroughly disc or plow under all plant debris after harvest. Eliminate cruciferous weeds from field which can act as hosts and rotate with non-cruciferous crops.

Apply and alternate one of the following preventatively and/or when conditions favor development:

Merivon--4.0 to 5.5 fl oz 2.09SC/A

Rotate with one of the following FRAC code 11 fungicides:

azoxystrobin--6.0 to 15.5 oz 2.08SC/A or OLF) plus fixed copper at labeled rates
Cabrio--8.0 to 12.0 oz 20WG/A plus fixed copper at labeled rates

Fixed coppers not for use in rutabagas

Scab

This disease is more severe under dry soil conditions, high soil pH, and low level of magnesium. Heavy irrigation in the first 2 weeks after emergence and the application of sulfur to reduce soil pH will assist in disease control.

White Rust

When weather conditions favor disease development or at the first sign of disease in field:

Apply:

Ridomil Gold Copper--2.0 lb 65WP/A every 7 days (not for use in rutabagas and turnip)

Alternate with one of the following FRAC code 11 fungicides:

azoxystrobin--6.0 to 15.5 fl oz 2.08F/A) or OLF
Cabrio--8.0 to 16.0 oz 20WG/A

Presidio and Ridomil Gold Copper applications will also help control downy mildew (see labels for restrictions).

SPECIALTY VEGETABLES

Niche Marketing

The term 'specialty vegetables' refers to the large group of crops that fit into several niche markets. They are sometimes called 'exotic' as they represent a class of vegetables unlike standard tomatoes, peppers, beans, peas and sweet corn, etc.; 'alternative' because they represent new enterprises that traditional vegetable growers might try; or 'designer veggies' that allow the consumer to be creative with their presentation. Specialty vegetables can be described as the new and unusual in the manner they are produced (organic, hydroponic); in the color, shape or flavor of the varieties grown (red and oakleaf lettuces, pear tomatoes, heirloom varieties and unusual greens like radicchio); in their size (baby, miniature, micro); or in their ethnic origins and demand (Asian crucifers and cucurbits,

Hispanic peppers, African greens and eggplants).

As with any new enterprise, developing a marketing plan for specialty vegetables is essential. There are several important points to consider:

- Before you plant, make sure you know where you will be selling your crop when it is ready to harvest.
- Be sure you fully understand all the quality, grading and packaging requirements, and costs for various market outlets. Apparently similar ethnic groups may want very different varieties of the same crop, or use the same/similar names for different types of crops, or different names for the same crop.
- Be sure to determine if consumers will want it when you can produce it.
- Assess the costs of production, especially the time and labor required. On-farm trials will help determine varieties and production systems, and small plantings will help work out problems that can be resolved easily (Maynard, 1995 see Section R). Keep accurate records of the small scale productions to be able to estimate costs and returns for larger commercial plantings.
- Increase production as demand grows, but be constantly aware of the number of competitors entering the enterprise. Here your prospective buyers may be the most revealing source of competition, though state and federal crop reporting agencies, and your local Extension workers are good sources of information.
- Project the effects on price that various levels of competitive supply will have to determine if returns will pay for any required capital costs over a specified period of time.

Keep in mind that a specialty enterprise may not be limited to a single vegetable, but may include a group of complimentary crops that fill a diverse market niche. Each crop may be a required part of the mix in order to gain a foothold in the market that a single crop will not allow.

Understanding marketing for specialty crops is the first step toward making profitable production decisions. The following sections describe the production practices for specialty vegetables grouped by the general market outlets for the specific crops to direct the producer's attention to that critical part of the decision process.

Specialty Vegetable Markets Organic & Hydroponic Production

Production practices which, in and of themselves, create niche-market 'specialty vegetables' are not the focus here. Most, if not all, of the crops described here. can be grown by 'organic' practices, i.e. those approved under the USDA National Organic Program. Likewise, using 'hydroponic' techniques to grow crops in a nutrient solution, normally in a controlled environment structure such as a greenhouse, is also suitable for many vegetable crops if there is sufficient market demand to justify the capital investment for this type of system. Both of these production systems require marketing to specific niche markets where demand is greatest for them. The combination of organically grown exotic vegetables may compound the demand.

Fresh-Cut Processing

The rapid growth of the convenience foods industry has encompassed fresh vegetables with the advent of fresh-cut processing, i.e. pre-packaged, ready-to-eat salads and washed, trimmed, pre-cut and ready-to-cook vegetables. The major ingredients used by the fresh-cut salad industry are mainstay vegetables like iceberg and Romaine lettuces, cabbage, carrots and spinach, complimented by a variety of additional crops that can provide color, texture and taste in both salad and stir-fry mixes.

Fresh-cut processing grew out of the need for convenience, but was allowed by advances in packaging and post-harvest technologies. The shelf-life of fresh vegetables, once cut, is inherently very short, especially leafy vegetables such as lettuces. Oxidative browning and decay follow rapidly. Development of breathable plastic films which create a miniature controlled atmosphere within the package reduces the levels of oxygen and ethylene while increasing the carbon dioxide levels. These conditions slow respiration, the chemical browning process, and reduce the growth of decay organisms. Sanitizing the produce before and during the processing greatly reduces the number of decay organisms entering the package (see Section A). The combination of handling practices and packaging materials has increased the shelf-life of fresh-cut products from a few days to several weeks.

Ethnic Vegetables

Economic opportunities have arisen in the last two decades for specialty produce farmers to cater to the increasing numbers of ethnically diverse consumers concentrated in the mid-Atlantic region. U.S. Census data shows that while the entire population increased by 13% from 1990 to 2000, the mid-Atlantic Asian population increased 60% and just five states (FL, GA, NY, NC, and NJ) accounted for over one-fifth of the nation's Hispanic population growth during the same time period. Major retailers are responding to these population shifts creating sales opportunities for both retail and wholesale growers.

It is critical to understand for which ethnic communities you will be growing in order to make the correct crop and variety selections, harvest at the correct stage, and package in appropriate containers. The worldcrops.org website was created to help growers exploring ethnic crop markets to understand the nuances of marketing to such diverse groups of consumers. For example, Hispanic cultures consume many types of peppers/chiles, but assuming every ethnic group wants one type of pepper would be a mistake.

Similarly, India *is* the 'eggplant capitol of the world' (not NJ!), but Indian consumers prefer a small, egg size, pink brinjal eggplant, while Chinese look for long, slender (12 inch x 2 inch) fruit, and people in various African countries consume a white, medium size eggplant (a little smaller than the traditional Italian eggplant) known as Bitter Ball. West Africans also use a pea-sized, red eggplant for medicinal purposes. Known as the Ghanan pea in most countries, it is called Kiteley in Liberia while Kitley describes Bitter Ball in Ghana.

A successful specialty/ethnic produce business obviously requires knowledge and experience. It is advisable to start small and build the business gradually.

Table F1. Common Ethnic Vegetable Crops for Mid-Atlantic Growers

(see worldcrops.org for more information)

Vegetable Types	Ethnic Community	Ethnic Crop Name
Solanaceous		
Eggplant	Brazil	Gilo
	West Africa	Bitter Ball, Kiteley, Ghanan Pea
	India	Brinjal
	France	Aubergine
Pepper	Mexico	Habanero
	Dominican Republic	Aji Dulce
Husk Tomato	Mexico	Tomatillo
Cruciferous	China, Southeast Asia	Napa/Chinese Cabbages, Pak choys, Mustards, Flowering Broccoli
Other Greens	West Africa	Jute
	India	Fenugreek (Methi)
	Mexico	Purslane (Verdolaga)
	Universal	Amaranth, Roselle, Malabar Spinach

“Designer Veggies”

This term was coined to describe unusual produce used by creative chefs' to decorate gourmet plates with more than a traditional garnish, “designer veggies” can be any crop grown for its size, shape, color, texture, or flavor. Types of “designer veggies” may include, but are not limited to, any/all of the crops described in the following sections. They are usually ‘trendy’ crops that help celebrity chefs stand out from the crowd, so one year's hot item (think Tuscan kale in 2013) may be a slow mover after a year or two, especially if a number of growers add more plantings. Radicchio is considered one of the original “designer veggies” for when it appeared in the marketplace in the mid-1980s there was nothing similar to its bright red leaves with contrasting white veins and strong bitter flavor. Today, while radicchio leaves are common ingredients in many salad mixes, recent studies show that it qualifies as a nutrient-dense ‘super food’. Coupling that with its ability to stand up to cooking in a variety of ways and increasing attention by food marketers, radicchio may once again be propelled into “designer veggie” status.

Success in the “designer veggie” business requires working closely with chefs and gourmand customers, paying close attention to food and trade publications and TV, attending produce and gourmet food shows, and being able to grow and deliver small quantities of labor intensive produce.

Baby, Miniature & Micro Vegetables Variety Selection

Though the publicity is perhaps not as great as during the late 1980's when they were faddish, demand for smaller vegetables among gourmet and specialty food outlets continues. Today, micro-greens may be the more popular version in highest demand. Micro-greens are seedling plants consumed at a stage between sprouts and baby sizes. They are cut above the soil line to include the cotyledon(s) and the newly emerging first true leaf, but no roots or seed

coats typically found in sprouted crops. Many types of vegetables can be harvested at these immature stages and sold as baby or micro-vegetables. There are other cultivars of vegetables which mature smaller than standard types of the same vegetable. These are referred to as miniatures. Most of the companies offering specialty vegetable seeds also recommend certain varieties for immature harvest in addition to listing miniature varieties.

Culture

Baby and miniature vegetables are planted and grown much the same as standard varieties. Plant spacing is one major exception, because miniatures are physically smaller and baby leaf and root crops are often harvested at the stage a standard variety would be thinned. Higher plant densities are desirable to maximize production. Baby leaf and some root crops can be grown in a solid bed created by broadcast seeding since they will be harvested before crowding becomes a factor. Spacing of miniature varieties will depend on the final size of the dwarfed plant. On the other hand, vegetables grown for their fruit (seeds or pods) such as beans, corn and squash should be grown at standard plant spacings to maximize output per plant. Crowding can affect the production of fruit reducing yields even if those fruit are to be harvested immature.

Field fertility is another production factor that may be modified depending on the crop and harvest stage. Immature, baby vegetables are harvested before they begin drawing significant amounts of nutrients from the soil. Most will perform with little additional fertilizer beyond the reserves left from previous crops.

Baby and miniature vegetables are good candidates for year-round production in high tunnels or greenhouses. With little heat, many greens can be planted under protection and scheduled to create a uniform production 12 months of the year. Similarly, micro-greens tend to be grown under protection and are also grown in a planting medium such as peat-lite, or a more solid medium such as rock wool or coir mats. Micro-greens production can be managed for year-round harvests and planting trays can be used as the packaging, delivering un-cut greens directly to consumers to harvest themselves. The market outlet (direct-to-consumer or direct-to-chef) would determine the size of the planting tray.

Postharvest Handling

Baby and micro-vegetables are immature crops at harvest-time and as such, both fruit and leafy crops tend to have higher respiration rates and are tenderer than when they reach maturity. Proper post-harvest handling procedures are critical to maximize shelf-life. Gentle handling and special packaging from harvest on are required to reduce bruising and dehydration. Rapid post-harvest cooling for removal of field heat is critical for extending the shelf-life. This may be combined with multiple washings to remove soil and field debris followed by spin-drying as a method of adding value for buyers.

Plastic-lined cardboard boxes, clear plastic food-service containers and inflated, resealable, plastic bags are some of the innovative packages tried in early tests. The industry has settled on 3-pound plastic-lined, or wax treated, cardboard boxes for the wholesale trade. Larger bulk boxes may be suitable to send these products to fresh-cut processors who eventually repackage their finished

products in the consumer-oriented plastic bags or clamshell boxes. These products allow both modified atmosphere treatment to reduce decay, and support throughout the bulk package to reduce bruising/injury caused by the weight of the product itself. Micro-greens that are harvested at the farm are offered the most protection by use of clamshell boxes. The grower will need to determine the appropriate package for the intended market.

Table F2. Baby and Miniature Vegetable Varieties and Harvest Stage

Vegetable Type	Harvest Stage 1	Varieties for Baby Harvest	Miniature Varieties
Beans	IF	Aiguillon Cristal, Fine de Bagnols, Blue Lake	
Beets	IR	Burpee Golden, Boldet Dwergina	Baby Beet Spinel Crosby's Egyptian Little Ball
Carrot	IR	Minicor, Round Paris Market, A&C Brand Nantes, Nantes, Scarlet Nantes S. T., Chantenay Red Core #5, Amsterdam A. B. K., Caramba	Carrot Sucrum Baby Long Carrot AMCA Planet Little Finger Amstel
Corn	IF	Any sweet corn variety harvested within 3 days of silk emergence - supersweet varieties with tendencies to produce multiple ears/plant will increase yields	Golden Midget Baby Asian Corn
Greens	G	Most greens, including mustards, cabbages (European & Oriental), chicories, etc. can be harvested at the 4" to 6" stage. A mixture of baby greens and lettuces can be sold as "Mesclun" salad mix.	
Lettuce	G	Green Oak Leaf, Red Oak Leaf, Merveille de Quatra Saisons, Sucrine, Lollo Rosso, Lollo Biondo, Red Grenobloise, Diana, Kagrner Sommer, Craquante D'Avignon, Red Salad Bowl	Tom Thumb Baby Oak Perella Red Perella Green Rougette de Midi Morgana Summer Baby Bibb Little Gem Mini Romaine Rubens Dwarf Romaine
Pepper, Tomato, Eggplant	IF	Fingerling eggplant	Miniature Baby Bell peppers, Cherry and Mini-Pear tomatoes
Radish	IR	Flamboyant, Flambo, Sezanne, Italian Oliva, French Breakfast	
Squash	IF	zucchini & yellow curved or straightneck, white & golden scallop, Jersey Golden Acorn, and Sweet Dumpling all can be harvested just before or after blossom drop.	
Turnip	IR	Milan Early Red Top, De Milan, Tokyo Cross, White Lady	Market Express

¹Codes for Baby Harvest Stage: IF = immature fruit, IR = immature roots (usually ½ inch – 1 inch diameter), G = greens (usually 4 inches – 6 inches and before head formation).

Table F3. Potherbs & Salad Greens

Leafy greens can be described simply as any plant grown for consumption of its fleshy leaves, petioles and/or stems, either raw or cooked. The list is long.

Types of Greens	
Lettuces:	Iceberg, Romaine, Crisphead/Batavia, Leaf, Bibb, Boston
Other Composites:	Endive and Frisee, Escarole, Radicchio, Dandelion
Mustards:	Arugula, Cress, Mustard, Turnip tops, Watercress
Cabbages:	Red, Green & Savoy, Chinese Napa
Spinach:	Flat leaf & Savoy
Oriental Mustards	Mibuna, Misuna, Mizuna, Pak Choy, Flowering Broccoli
Other Oriental Greens	Tricolor Amaranth, Shungiku Chrysanthemum
Miscellaneous:	Beet tops and Chard, Belgian Endive, Mache/Corn Salad, Orach, Claytonia/Miner's Lettuce, Sorrel, Purslane, Pea tips, Nasturtium leaves
Herbs	Parsley, Basils, Borage, Chervil, Chives, Fennel, Salad Burnet
Edible Flowers	Nasturtium, Viola, Violets, Pansy

Mesclun (French)/Misticanza (Italian)

Mesclun describes mixed vegetables, typically young salad greens, or stir-fry mixes including spicier mustards. Salad mixes, baby lettuce mixes, or mesclun mixes are blends of fresh, tender greens combined for their variety of textures, flavors and colors that are grown, harvested, and marketed together. Leaves are harvested by cutting and plants may be allowed to regrow. Ingredients vary, consisting of blends of many varieties of the crops listed in Table F3.

Culture

Several factors affect how leafy greens will be produced. The market you are growing for determines the type of crop (heading or non-heading) and harvest stage (baby or mature), which in turn establish plant spacing, length of time from planting to harvest, pest control practices, and post-harvest handling practices.

Plant Spacing

Maximizing production of leafy greens means covering as much of the ground as possible. A 54-66 inch wide by 4 inch high bed, enough to fit between tractor wheels set at 5-6 foot spacing, is standard in the Vineland area in New Jersey. Three to six rows, determined by the size of the crop, are spaced evenly across the bed.

Three rows are used for the largest heading cabbages which require 20-24 inches between plants in the row. Leaf, romaine and iceberg lettuces, and endives are spaced 14-18 inches in the row. Precision seeding allows even spacing of two to three plants for each intended plant to harvest. Extra plants are hand thinned to proper spacing two to four weeks after emergence. Seedlings started earlier in greenhouses are transplanted at proper spacing in the row to achieve the earliest harvest.

Spinach, mustards, and lettuces grown for baby greens, use four or five rows on a bed, depending on the machinery setup of the farmer. Plant spacing in the row is 3-4 inches for spinach, up to 6-8 inches for mustards, and as little as 1 inch for baby greens. To push even more production from a given area, spreader shoes on the seeder creates a wide band of seeds. Effective herbicides are critical for establishing crops in this type of system as hand hoeing is not possible, and cultivation is more difficult.

Six- or eight-row beds are normally only used for radishes, but depending on the harvest equipment to be used, growers are experimenting with as many as 12 rows/bed and spreader shoes for baby lettuce production, effectively creating a solid bed of seedlings by harvest time.

Time From Planting to Harvest

Baby greens are just that. If they are more than 6 inches tall, then they are too old for the market. That means arugula and other mustards will barely be in the ground 2-3 weeks. Lettuces will take slightly longer to be ready, but by 6 weeks, most leafy greens are beyond the baby stage.

However, just as quickly as the baby stage passes, most leafy greens are fast crops. The majority of mustards, including the leafy oriental types, will be ready for harvest in 40-45 days. Leaf lettuces are ready 45-55 days from planting.

Heading type plants take longer. Romaine and iceberg lettuce are 60 to 80 day crops, while cabbages can take as little as 85-90 days for early types to as much as 110-115 days for main season crops. To get a jump on the season,

most heading types of greens, and some leaf lettuces, are usually started in greenhouses growing 4-6 week old plants to be ready for transplanting between mid-March through April.

Mixed plantings of salad greens can be mechanically harvested.

Pest Control under Protected Culture

Baby greens production can be extended in the field by the use of floating row covers (FRC) and nearly year-round in most of the mid-Atlantic states using high-tunnels. Pests that are likely to be encountered in greens grown at high densities in high humidity are slugs, white flies, and botrytis. Slugs can be trapped and there are parasites for controlling white flies now. Maintaining constant air circulation and adequate ventilation to reduce high humidity within the plant canopy will reduce the incidence of botrytis. If making multiple harvests, carefully remove all dropped cut leaves because botrytis, as well as bacterial soft rot, gets started on injured tissue.

Pest Control

Weeds

Weed control may be the most difficult aspect of “baby” leafy green and herb production. Herbicides are labeled based on botanical crop groupings, not generic uses of the crop. Consult the weed management sections of this publication for herbicide recommendations for specific crops. Consult table E-4 and the herbicide label to determine the preharvest interval (PHI) for the crop to determine the time between herbicide use and harvest fits the preharvest interval (PHI) required.

Consider preplant tarped fumigation for weed control in crops without registered herbicides. Use horticultural weed control methods such as stale seedbeds or plastic mulch when applicable. Rely on mechanical weed control which must be done in a planned, timely fashion. Most crops relying on mechanical weed control will require multiple cultivations. Cultivation can be more difficult in crops with close in-row and between row spacing. Resort to hoeing and hand weeding when necessary.

Insects

Careful crop monitoring is required to produce insect-free greens. Timing production and physical insect barriers such as floating row covers can effectively control insects on many of the shortest season crops, longer season crops usually require insecticides of some type to protect them from an array of root maggots, lepidopteran larvae, aphids, thrips, flea beetles, and more. Effective IPM scouting can identify pest population changes and alert the grower when a pest control application may be required. Given the diversity of crops within this group, there may be unexpected pests occurring on small plots of crop plants, making control even more difficult.

Basil Downy Mildew

Downy mildew (*Ocimum basilicum*) will cause significant losses in sweet basil if left uncontrolled. The pathogen may be present on infested seed. Currently, there are no effective seed treatments. Buy seed from a reputable source. All sweet basils are susceptible to the disease. Many spice and lemon/lime type basils have tolerance to the disease. Grow basil in the spring and early summer

when there is a less of a chance for downy mildew in the region. If basil downy mildew appears in early spring on your farm then seed may have been infested. It is thought that basil downy mildew spores are carried into the region on same weather systems that bring cucurbit downy mildew up from southern region of US each year. As long as seed is not infested, basil downy mildew should move into the region during the summer months or later. Follow local and regional Extension reports for progress in US.

Apply a phosphorous acid fungicide (FRAC code 33) such as K-phite, ProPhyt, Rampart or OLF at the highest labeled rate on a weekly basis as a foliar spray right after emergence or prior to the arrival of the pathogen in the region. Research has shown that weekly foliar applications work better than weekly drip applications of FRAC code 33 fungicides.

Tank mix and rotate a FRAC code 33 fungicide at the highest labeled rate with one of the following fungicides on a weekly basis:

Ranman--2.75 to 3.0 fl oz 400SC/A (0-day PHI) (12 hr REI)

Revus--8.0 fl oz 2.08/A (1-day PHI) (4 hr REI)

Ranman can be applied in a greenhouse (see below)

Damping-off (caused by *Pythium* spp.)

Apply 1.0 to 2.0 pt Ridomil Gold 4SL/A as a banded spray or through drip irrigation at emergence or right after transplanting (21-day PHI) (48 hr REI)

Ridomil Gold SL at seeding will also help suppress basil downy mildew.

Greenhouse use:

Subdue Maxx--3.75 fl oz/5000 ft² (32.0 oz/A) as a soil

surface spray to plug production trays after seeding and before seedling emergence (21 day PHI)- see Section 24(c) special local needs label to see if available in your state for use; and for specifics and restrictions.

Phosphite fungicides (FRAC group 33) such as K-phite, ProPhyt, Rampart or OLF at the highest labeled rate (0 day PHI (4 hr REI)

Ranman--2.75 to 3.0 fl oz 400SC/A (0 day PHI) (12 hr REI)

Heritage--0.9 oz (8.0 oz/A) to plants following transplant of plugs trays, pots, or containers in which plants are grown to finish (0 day PHI) (4 hr REI) see Section 24(c) special local needs label to see if available in your state for use; and for specifics and restrictions.

Mesclun

California is the center of mesclun production and they've been growing under hoop houses for years. I'm not sure if anyone is using heated raised beds, but it should work. You'll just need to be on top of water management since the heated beds will dry out faster, and baby veg. don't take water stress too well.

The major pests I would expect to encounter in greens grown at high density in high humidity would be slugs, white flies, and botrytis. Slugs can be trapped (the old stale beer in a pan trick) and there are parasites for white flies now. Botrytis needs plenty of air movement and ventilation. You also need to be careful not to drop cut leaves if you will be making multiple harvests because botrytis gets started on injured tissue (bacterial soft rot does also).

Mesclun is still in high demand in many metropolitan areas.

SPINACH

Varieties¹

Fall (summer planted)

Renegade* (Semi-savoy; DM races 1 – 7)
 Carmel* (Semi-savoy; DM races 1 – 11, 13)
 Ragoon* (DM races 1 – 10, 12)
 Interceptor* (DM races 1 – 7, 9, 11)
 Python* (DM races 1 – 7, 9, 11)
 Tyee (Semi-savoy; DM races 1 – 3)
 Emu* (Slow bolting; DM races 1 – 10)
 Melody* (Savoy; DM races 1 – 2, CMV)
 Regal* (Semi-savoy; DM races 1 – 7, WRR)
 Space* (Semi-savoy; DM races 1 – 3)
 Sardinia (Semi-savoy; DM races 1 – 7)
 Samish* (Semi-savoy; DM races 1 – 4)
 Unipack 12* (Slow bolting; DM races 1 – 4)
 Unipack 151 (Semi-savoy; frost/heat tolerant; DM races 1 – 4)
 Rushmore* (Smooth, slow-bolting, DM races 1-5, 8, 9, 11, 12, 14)
 Palco* (Savoy; DM races 1-5, 8, 9, 11)
 Space* (Smooth; DM races 1-3)

Summer (spring planted)

Donkey* (Semi-savoy; DM races 1 – 11)
 Renegade* (Semi-savoy; DM races 1 – 7)
 Carmel* (Semi-savoy; DM races 1 – 11, 13)
 Regiment* (Semi-savoy; DM races 1 – 7)
 Tyee (Semi-savoy; DM races 1 – 3)
 Corvair* (DM races 1 – 11)
 Olympia* (DM races 1 – 3)
 Emporer* (Savoy; DM races 1-10)

“Baby” leaf type

Carmel* (Semi-savoy; DM races 1 – 11, 13)
 Scarlet* (Red vein; DM races 1 – 3)
 Swan* (DM races 1 – 10)
 Avon* (Semi-savoy; slow-bolting; PM races 1-2)
 Edna* (Semi-savoy; DM races 1-10)
 Riverside* (Smooth; DM races 1-11)
 Imperial* (Asian; DM races 1-7, 9, 11, 13)

¹ Processors generally specify preferred varieties for contracted plantings;

Disease resistance/tolerances (according to vendors) and specialty characters in parentheses (); DM = downy mildew.

Varieties listed according to days to maturity according to vendors (25 to 55 days).

*F₁ hybrid variety