

***Anaphalis margaritacea*: A new perennial crop to meet consumer demand for native low maintenance gardens**

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EXECUTIVE SUMMARY

In the summer of 2018, University of Minnesota Plant Breeder Dr. Neil Anderson traveled to the outer Aleutian Islands and gathered several different species of plant for further evaluation as possible bedding crops. This paper focuses on the evaluation of three distinct samples of *Anaphalis margaritacea* L., commonly referred to as pearly everlasting, that were collected on that trip. *Anaphalis margaritacea* L. is a hardy perennial native to much of North America. Several cultivars of the plant are available commercially, but they are mostly limited to use by landscapers and native prairie restorers. The plant is usually propagated from seed, a process that can take up to a year, involves lots of labor, and tends to have poor germination (47% - 64% Germ). Early analysis of the Aleutian plants indicates that they have unique ornamental characteristics and potential as perennial bedding plants, particularly for gardeners interested in

low maintenance or native perennials. Additionally, it seems likely that *Anaphalis margaritacea* L. is a good candidate for vegetative propagation as an alternative to seed sowing.

I. INTRODUCTION

A. Study Species.

Anaphalis margaritacea L. var. unknown. Common name Pearly Everlasting



FIGURE 1. Top view of *Anaphalis margaritacea*.



FIGURE 2. Side view of *Anaphalis margaritacea*. Note the rhizomes that had emerged from the bottom of the container and leafed out.

B. Taxonomic Classification and Geographic Distribution in the Wild.

Taxonomy:

Anaphalis margaritacea L. var. unknown, Pearly Everlasting, Family Asteraceae

There are at least three distinct varieties of *Anaphalis margaritacea* and one subspecies:

Anaphalis margaritacea var. *cinnamomea* (DC.) Herder ex Maxim.

Anaphalis margaritacea subsp. *japonica* (Maxim.) Kitam.

Anaphalis margaritacea var. *margaritacea*

Anaphalis margaritacea var. *yedoensis* (Franch. & Sav.) Ohwi

Geographic Distribution (native and/or invaded regions):

The species is native to a broad swath of North America including most of Canada and the United States, particularly Alaska and the Aleutian Islands (Hulte, 1960; Anderson, 1974; Trindle and Flessner, 2009). Other members of the genus are found throughout Asia and into Europe, but particularly in the Kamchatka regions of Russia and in Japan.

General climactic conditions in which *Anaphalis margaritaceae* grows:

The plant has shown itself to be widely adaptable to climates with differing temperatures and moisture. It survives well in the cold of Northern Canada as well as the heat and humidity of Virginia, and the dry prairies of the west. It is particularly successful in disturbed soils, along roadsides, and in highly drained soils that might be problematic for other plants groups (Trindle *et al.*, 2001; Archibald, 2007). Often, it is one of the first species to recolonize an area after landslides, fires, etc. Data from species in the Pacific Northwest show that the plant is found at elevations ranging from 2500 to 7000 feet. (Trindle and Flessner, 2009). As it is also found at sea level in other areas in its range, it would seem *Anaphalis* is adaptable to a wide range of elevations, probably a key to its successful distribution across such a diverse landscape.

Tendency to naturalize or become invasive:

No references were found indicating that the species is invasive. The plant does spread from rhizomes and will reseed itself readily (Hulte, 1960; Trindle *et al.*, 2001). Several nurseries did mention that it will spread quickly once established, but there were no reports of it being too competitive with other plants ('Morning Sky Greenery Nursery'; 'Prairie Restorations Inc. '; 'Prairie Moon Nursery. '; Trindle and Flessner, 2009). As it is a native plant naturally widespread throughout almost all of the U.S. and Canada, it is not likely to prove invasive here. However, as some native plants can become invasive under the right conditions, cautions is warranted when initially releasing the plant as a garden perennial, especially given its demonstrated ability to establish itself and spread

quickly. Further research is needed into the proper spacing the plant should have and if it can be planted in a mixed bed without crowding out its neighbors.

Taxonomic Description:

Anaphalis margaritacea's foliage is initially low growing, forming groups of silver-gray rosettes (*Fig. 1*), somewhat similar in growth habit to *Sempervivum* (hen and chicks). Leaves have soft pubescence (trichomes) that are appealing to the touch and give the plants a unique furry look. Leaves are thick and watery, and the overall appearance of the plant lends itself to classification in the increasingly popular succulent type.

The plant sends out rhizomes that readily root and develop into new rosettes (*Fig. 2*). At the time of examination for this paper, all three specimens had rhizomes spreading out of the bottom of their pots and with well-developed leaves (*Fig. 2*). The roots are adventitious and fibrous. No taproot is discernable in mature plants.

The flowers form on tall stalks, up to a meter in height. The flowers are small but unique. They are daisy like, with white bracts around a cluster of center florets, but the bracts stay semi-closed giving the flowers the appearance of a small hard-boiled egg that had the top peeled off. The plants are dioecious with individual plants having either male or female flowers. This greatly increases the chance that outcrossing may have led to the development of unique wild varieties, particularly in isolated environments like Attu (Hulte, 1960; Anderson, 1974; Trindle and Flessner, 2009). Flowers dry easily and keep well, making them a potential plant for cut-flower production and flower arrangements. Regardless of location, flowering for established plants is around June. ('Prairie Moon Nurs.'; 'Morning Sky Greenery Nurs.'; 'Prairie Restorations Inc.'; Archibald, 2007) As daylength through its native range can differ significantly from one location to the other, the report of ubiquitous June flowering makes it likely that flowering is not photoperiodic for this species.

Use(s) by indigenous people(s)

Both wholesale nurseries and researchers make a point of noting that *Anaphalis margaritacea* was used by indigenous peoples in its native ranges for medicinal purposes ('Prairie Moon Nursery'; Ahmed *et al.*, 2004). It was used to treat respiratory ailments and sore throats. In recent years, researchers have confirmed that it does contain compounds with antimicrobial potential (Ahmed *et al.*, 2004).

Is this an edible crop?

The leaves of the plant are edible, though its consumption seems to have historically been tied strictly to medicinal uses. There is no information about its possible culinary benefits, and its fuzzy leaves, though interesting to touch, do not seem like something that would provide a pleasing mouth feel to consumers.

Does this crop have any particular attributes useful for medicinal or other purposes?

Anaphalis margaritacea is a host plant for the American painted lady butterfly and also prairie skippers. This makes it particularly useful in native restoration plantings and gives it marketability as a potential back yard butterfly attractant.

CROP SPECIES

History and Potential Uses

Table 1. Current sources of commercially available Pearly Everlasting (<i>Anaphalis margaritacea</i>) along with cultivar info and container size used for sales. Plants from all sources are propagated by seed.		
Nurseries	Cultivar	Container Size
Prairie Moon Nursery	Info not available. Likely seed harvested from wild populations	3 packs of medium size pots
Morning Sky Greenery Nursery	Info not available. Likely seed harvested from wild populations	6 packs, 3 ½ inch pots, 5 ¾ inch pots

Prairie Restorations, Inc.	Info not available. Likely seed harvested from wild populations	Standard 6 packs
Glacial Ridge Growers	Info not available. Likely seed harvested from wild populations	Not Available

Anaphalis margaritacea is available for purchase from commercial nurseries, but there are only a handful of them across the U.S. and almost all of them specialize in the production of native plants for restoring natural areas. There seem to be few, if any, sales to home gardeners looking for hardy, low maintenance perennials. This could possibly be a new niche for the crop.

There do not appear to be any current breeding programs for this crop, nor could any evidence be found of breeding programs in the past. Plants sold from nurseries appear to have all been started by seeds collected from wild populations. When the source of seed for nursery production was available, it was usually somewhere in the pacific northwest (Oregon and Washington, particularly around Mt. Ranier). There is no evidence that the plant is part of any wider distribution chain of produces/distributors/growers. The few nurseries selling *Anaphalis margaritacea* seem to be self-contained, producing the plants from seed to sale.

Anaphalis margaritacea's general low maintenance and wide adaptability make this a potentially ideal perennial for busy gardeners who forget to water. The plant's silver, fuzzy foliage will stand out in perennial beds adding a different texture while also supply interesting flowers that are different enough from the common daisy family flowers to make them exotic. The flowers dry easily on long stems and will last for a long time which lends *Anaphalis margaritacea* to use as a cut flower, especially for growers selling at markets which cater to customers interested in local, native, and environmentally friendly types of flowers.

The plant is suitable for plug production and growing guides do exist. However, they all focus on starting plants from seed, a process that is long, labor intensive, and prone to inefficiency (Archibald, 2007; Trindle and Flessner, 2009). First year seedlings are small and susceptible to rots if irrigation is not carefully monitored. Given how easily the plant spreads from rhizomes, it is an excellent candidate for vegetative propagation. That could significantly reduce the crop schedule for production and result in bigger, more marketable clumps of rosettes much faster. During the research for this paper, no information was uncovered to indicate that anyone had ever tried propagating the plant vegetatively or that there were issues with rooting cuttings that made seed propagation more useful. Lack of veg. production with this crop may simply be due to the fact that the only producers of commercial plants are all native prairie landscapers where harvest and sowing of native plant seed is a major part of their business.

A. Anticipated Cultural Requirements.

Life Cycle: As a hardy perennial, cultural practices should focus on producing a plant with several well-developed rosettes, a strong root system, and developing rhizomes, but not one that is flowering at the time of sale. The time to develop a retail ready plant will vary greatly depending on whether plants are propagated from seed or from cuttings. Seedling production will likely take six months to a year before the plants are in the desired form for sale. Propagation from vegetative cuttings will likely result in a much shorter production schedule of around 12 weeks to retail ready plants.

Seed propagated plants will not flower their first year offering plenty of time for plant development (Trindle *et al.*, 2001). Plants started from vegetative cuttings may flower in their first year, which will affect the timing of production to ensure non-flowering plants at retail. As of this time, it is not known if the plants are LD, SD, or day neutral. However, they seem to

flower in mid to late June across their entire native range, so growers should plan to have vegetatively propagated plants ready for retail by late April to early May.

Depending on the desired final container size, it may be advisable to put 2-3 rooted cuttings into the pot in order to give the sale plants a “fuller” look. This would likely take significant time off the production schedule by not having to wait for the multiple rosettes to form from one cutting. As the plants both send out fibrous roots and rhizomes, this could lead to very root bound containers if multiple plants are left in containers too long before being sold. Growers will need to experiment based on the growing conditions in their region to determine what the optimal time frame is for potting multiple plants without developing overly root bound plants.

Our experiment with cuttings found significant difference in the success and speed of development based on where the cuttings came from. Cuttings were taken from the tips of rhizomes yet to emerge from soil, from middle sections of unemerged rhizomes that had developed some roots, and from emerged rhizomes that had developed small rosettes of foliage. All cuttings rooted when placed in 1000ppm IBA, however all of the cuttings from rhizome tips and 45% of the middle section cuttings died within 3 weeks of transplant. The remaining cuttings all developed rosettes, however cuttings from the emerged rhizomes developed significantly faster and were larger and fuller than the rosettes on the middle section cuttings.

This indicates that for vegetative production, cuttings should be taken from stems that have emerged from the soil and already are developing foliage. Culture of mother plants should focus on maximizing the number of rhizomes that emerge from the soil and leaf out. Planting them in shallow open trays, similar to a 1020 germination tray is likely ideal for the production of cuttings. Growers will have to experiment to find if that provides the right balance of proper root depth for mother plants and a maximization of rhizomes that reach the surface to produce harvestable rosettes.

Plant Characteristics:

Anaphalis margaritaceae has characteristics that could make it an excellent fit for three specific market areas; as perennial bedding plant, as a “local” cut flower, and as a unique new option for lovers of succulents. Its lower water needs and general hardiness in multiple settings mean it can be marketed as a native, low maintenance perennial for the home gardener, particularly as a ground cover since its habit of sending out rhizomes allows it to quickly establish itself beyond the initial planting area. This would appeal both to customers who are following the trend of filling their gardens with plants native to their region and also to gardeners who want plants but do not have the time to stay on top of tasks like watering or weeding. Being native to so much of North America, would allow *Anaphalis margaritaceae* to be labeled as a native across much of the country increasing its marketability. Being a perennial gives it an added appeal to low maintenance gardeners because they can plant it once and be done unlike annuals which they have to plant and maintain year after year.

Anaphalis margaritacea's cut flower potential lies mostly as an accent or filler to other bouquets. Its unique egg like flower shape will provide different texture and novelty when tucked in amongst other showier flowers. It also has relatively long stems making it ideal for vases. Because the plant is perennial and will spread, it could be marketed to cut flower growers as a plant with a long return on investment, increasing in size and thus production every year with minimal inputs unlike popular but high maintenance annuals. The plant would be particularly marketable to small growers focusing on “local” or “sustainable” floriculture production. These are likely growers selling at Farmer's markets or similar venues where the story of *Anaphalis margaritacea*'s native roots will likely be popular.

The plant also has succulent leaves and the pre-flowering plant habit looks similar to a larger fuzzy leafed *Sempervivum* or similar succulent. Given the popularity of succulents in recent years, *Anaphalis margaritacea* may have an opening as a unique new entry into this field. It could be marketed as a succulent that's also fun to touch or pet like a potted cat since the trichomes on its leaves give it the appearance and feel of being furry. This would make it stand

out from almost all other succulents on the market. Further breeding is likely needed to make it an ideal plant for smaller pots or other common succulent containers, but the potential is definitely there.

Winter Hardiness & Heat/Drought Tolerance:

Based on the native range of *Anaphalis margaritacea*, it should be cold hardy to zone 3a and potentially even colder. It is important to note however, that the plants used for this examination were sourced from the Aleutian island of Attu which has a hardiness zone of 8a. Given the isolation of that island, it is possible that enough variation has occurred in the genetics of this distinct sample to make it less hardy in colder zones. Field trials are recommended before release to customers to confirm zone 3a survivability. The plant should also be able to survive through heat zone 10 as it has been reported to be native in southern Texas and the states of the American Southwest. This wide range of cold tolerance and heat resistance make *Anaphalis margaritacea* suited for sale across a broad swath of the country. Growers would have considerable regional markets to sell their product in and likely will find the plant less finicky to ship.

Potential Production Environment:

Anaphalis margaritacea is not a finicky crop and will do well under the same greenhouse conditions as many other plants. Supplemental lighting will likely be beneficial particularly in northern parts of the United States. Current trials are being done to determine if the plant exhibits any photoperiodism. As test plants were grown under long days without any signs of negative effects or early flowering, lighting for LD is currently recommended. Day temps of 25°C with night temps no lower than 10°C should be sufficient for growth, but experimentation is encouraged to find what temp ranges prove optimal. The effects of soil pH on *Anaphalis* are unknown and should be further explored. Until further knowledge is established, maintaining a soil pH of ~6.5 is recommended as a best practice, as well as using non-ammoniacal based sources of N. Plants sampled for production all did well in a typical commercial soilless growing

media, both as medium for established plants and for taking cuttings. Cuttings were kept in a mist house for 10 days. This proved sufficient but further research is needed to determine if a shorter/longer time period would have resulted in more successful rootings. Cuttings should all come from rhizomes that have emerged from the growing medium and have developed leaves. It is important to transplant rooted cuttings into containers that will not become too rootbound. 4” pots are likely the smallest that would provide the proper area and depth. Larger gallon sized pots may work even better, especially if the grower decides to pot multiple rooted cuttings together. Potting multiple cuttings in one pot will likely be quicker a to create a more appealing “filled” look than if individual plants are left to develop on their own. Further research is needed to determine if this is cost effective. *Anaphalis* has a low habit until flowering, so no PGR’s or pinching should be needed. It is currently unknown if the crop needs vernalization to flower, however since many plants in the Asteraceae family do require a vernalization period, it is probably a best practice to provide a cold treatment or apply GA if flower production is wanted. Since the plant will be sold as a perennial and it will not be desired for it to be in flower at the time of sale, most growers will not need to concern themselves with vernalization.

B. Market Niche.

Target Sales Date(s): *Anaphalis margaritacea* should be grown for sales at the start of outdoor gardening season, likely late April or early May in most markets. The plant has no special affiliation with holidays or other dates that would warrant pushing sales at other times of the year. The plant will likely sell better as mounds of attractive rosettes that have not yet flowered. Late summer or early fall may present a secondary sales window where *Anaphalis* could be marketed as a replacement for other perennials that did not survive the summer or as an ideal filler for bare spots that are easier to see at the end of the growing season. That time frame may work better for seed propagated plants which don’t flower their first year and have a naturally

longer production period that would be wrapping up around that time frame. Seed plants will likely have a fresher neater appearance at that period than veg plants rooted during the heat of the summer.

Programmability:

Since the desired result for sale is a well-developed set of rosettes instead of flowers in bloom, there is no need to program the plants for production during certain times of year.

Vegetative propagation certainly could be done at any time of year and given the potential wide sale distribution of this plant, growers may want to have multiple successions of cuttings going at different parts of the year in order to meet sales windows across the country.

Cut flower production may warrant being able to force the plant year-round, however there currently is no research to provide insight on whether or not that is possible. Other members of the Asteraceae family (such as mums) are successfully programable and of use in the cut flower industry, so it is possible that *Anaphalis* is similar. If cut flower growers show interest in the crop, further research should be done on its programmability.

Potential Crop Limitations:

There are potential limitations that this crop could face. Only rhizomes that had emerged from the soil and started developing leaves were 100% successful when used as cuttings. This will limit the material that can be used for propagation and is an inefficient use of the significant amount of rhizomes the plant produces under the soil. Additionally, the cuttings from underground rhizomes showed signs of damping off which may indicate fungal susceptibility in the cuttings, though the small sample size examined for this paper is not enough to say for sure.

The flowers of *Anaphalis margaritacea* may not be appealing to a wide audience. They are unique and photos of masses of them appear appealing, but they may lack the oomph that perennial gardeners are looking to spend money on. A major appeal of the plants is their

succulent like rosettes and low growing tidy habit. Once the plant flowers, it will significantly alter the height and form of the plants. In addition to running the risk of not being appealing to the customers, this also limits the plants use in areas it may have been ideally suited for before flowering, such as container gardening for decks, fairy gardens, or other small places.

Any plant that sends out runner risks being too aggressive for some gardeners. Though no literature specifically mentions *Anaphalis margaritacea* as being invasive or weedy, multiple sources state that it is often an early colonizer of disturbed soil and can establish strong colonies of growth. Its use by landscape naturalizers also would seem to indicate that the plant spreads extremely well and competes well against weeds. This would seem to indicate that *Anaphalis* itself can become a weed or choke out its neighbors in smaller gardens. Field trials should be done to determine if this is a concern that breeding needs to address and to give consumers an accurate plant spacing at the time of sale.

Competitive Crops:

There are often many native perennial plants offered at retail garden centers these days. All of them could to some extent be competitive with *Anaphalis margaritacea*. Other daisy type plants abound at garden centers and will be competitors both in habit, appearance, and low maintenance. There are similar native plants such as *Echinacea* or *Rudbeckia* that come in a variety of habits and colors that *Anaphalis* simply cannot compete with currently. These may be more appealing to native gardeners and are more likely to be given a spot or *Anaphalis* in smaller gardens. None of these competitors however function as effective ground covers or could be sold alongside the increasingly popular succulents. Focusing on *Anaphalis*'s versatility, unique blooms, and intriguing succulent foliage will be keys to *Anaphalis margaritacea*'s competitiveness.

Marketing Story:

Golden Growers is excited to announce the introduction of a stunning new native perennial with the low maintenance needs of modern gardeners coupled into the succulent form and exotic look that's capturing the attention and dollars of today's millennial buyers. Be one of the firsts to reap the rewards of growing *Anaphalis margaritacea*, commonly called "Pearly Everlasting". This new edition is a vegetatively propagated entry originally sourced from remote and exotic Attu Island by famed plant breeder and chrysanthemum expert Dr. Neil Anderson.

Though long used as a native landscaping plant across North America, the multiple appeals of Pearly Everlasting have never been fully capitalized in the retail garden market. Our plant has multiple appeals. Its soft gray foliage forms handsome, succulent rosettes sure to stand out. It is hardy across most of North America, handles drought and heat to zone 10, and takes cold to 3a without problem. It meets the increasing demand for native cultivars, but in a unique form of furry soft leaves in colonies of succulent rosettes you just don't find in many native offerings. The flower shape is just as intriguing with miniature blooms in an egg like shape that is sure to draw murmurs. Flowers are born on high stems ideal for cut flower production and will last for weeks when dried. Additionally, our strain of *Anaphalis margaritacea* is vegetatively propagated cutting the production time in half and removing the labor intensive and costly seed production that has hindered development of this crop as a garden cultivar.

Be the first to start reaping the rewards of this diverse new entry to the market and ask your suppliers for Pearly Everlasting today. We expect full production to be ready in 1-2 years but are happy to provide samples for early trialing to growers, retailers, and consumers alike. We know you'll be convinced.

II. PRODUCT INFORMATION GUIDE (PIG) & CROP SCHEDULE

Propagation method: *Anaphalis margaritacea* is naturally inclined for vegetative propagation.

Establishing Stock Plants for cuttings: Up to 1 year

Source Plants:

There are no known producers of stock plants for *Anaphalis margaritacea*. Mother plants can be chosen from the previous year's crop of cuttings or started from seed purchased from a supplier.

A brief guide for starting mother plants from seeds is listed below:

In late April to early May sow 2-3 seeds per cell in 288 plug trays filled with a well-drained soilless media. Place trays in a 10° to 18° C mist house until germination (10 – 14 days). No fertilization is needed at this stage. Remove seedlings as soon as germination has occurred to prevent damping off.

Transplant seedlings to 3.5 inch pots filled with a well-drained soilless media and begin feeding with a balanced fertilizer at about 100ppm N. Grow plants in the greenhouse until early June, then move outdoors to a shadehouse (40% shade cloth). Do not over water the plants, and allow them to slightly dry out between waterings. Remove the shade cloth in August and continue growing outside until frost threatens.

In December to January, remove mother plants from containers and transplant them into 1020 germination trays (with drainage holes). Place 5-6 plants per tray, spreading out any developing rhizomes and thinly covering them with soil. This should force more rhizomes to break the surface and leaf out. Continue watering and fertilizing as normal. Plants should have multiple shoots by late February/early March that can be used to take cuttings.

Propagating Unrooted Cuttings: 2 weeks

Cuttings: When selecting cuttings from stock plants, only take cuttings from rhizomes that have breached the surface and have started to leaf out. Production time will increase significantly, with less successful rooting if cuttings are taken from buried rhizomes. Cuttings should be 3-4 inches in length. If finishing containers will have one plant per container, pinch off the tip of the apical meristem to induce branching. If multiple plants are to be used in the final container, this step can be skipped.

Media type: Choose a well-drained soilless media

Media pH: Maintain a slightly acidic pH, around 6.5.

Rooting Hormone: 1000ppm IBA. Only need to cover the tip of the cut portion.

Plug Size: Recommend 72 cell plug trays

Temperature: 20° – 23° C

Facilities: Rooting will be most successful if cuttings are placed in a mist house until callous tissue has formed and the beginnings of roots are present. This may take up to 2 weeks. Remove plants from the mist house as soon as rooting has begun to prevent issues with rot.

Fertilizer: Fertilizer is not needed at this point

Growing to finish: 12- 14 weeks

Media: Use a soil-less with media with good drainage. Rot is likely if media is too saturated.

Media pH: maintain the pH at a mildly acidic 6.5

Finishing Container: Finish cuttings in 3.5 inch pots or bigger as desired.

Temperature: 18° to 20° C

Moisture level: Water plants regularly, but do not let the soil become too soggy or issues with rot will occur. Additionally, once rosettes are forming beware of water droplets pooling in the foliage and creating an environment for fungi. Plants will wilt quickly if the soil becomes completely dry.

Fertilizer: Continuous feed with a balanced fertilizer at a rate of 100 – 150 ppm N.

Light: Plants are day neutral. Lighting for long days may result in fuller plants at finish.

PGR's: Plant habit while vegetative is very low and does not require the use of any PGR's

Desired finish traits: Several rosettes of foliage should be filling the container with no visible soil at the top. Flowering should not have initiated, and roots/rhizomes should be filling containers but not protruding from the bottom.

Additional Information:

Total Crop time: 14-16 weeks (if not starting mother plants for cuttings from seed). 1 year (if starting mother plants for cuttings from seed)

Common problems: Susceptible to rot if soil is left too wet. This is true at all stages of production. Because of dense rosettes, it can be difficult to properly water once the plants have filled in and are covering the pot. It may be necessary to irrigate from the bottom of the containers. Rhizomes will quickly overgrow into neighboring pots or through drainage holes if plants become too root bound. This tangles plants and may complicate shipping. Stick to the prescribed growing schedule and monitor plants frequently as they begin to fill in.

Shipping: There should be no issues with shipping this plant as long as it has not been left in final containers too long. Plants are short in their juvenile/vegetative stage, have no main stems to risk breaking, and seem to shrug of handling.

Crop Schedule

Stage	Container Size	Plants per cell	Time	PGR
Seeding Mother Plants	288 cell plug	2-3 seeds	1 year	None
Rooting Cuttings	72 cell plug	1 cutting per cell	2 weeks	None
Finishing	3.5" pot	1 if pinched; 3-4 if not pinched	12 - 14 weeks	None

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