Lunaria rediviva - New Crop Summary & Recommendations

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Horticultural Science 5051: Plant Production II
University of Minnesota
LUNARIA REDIVIVA

NEW CROP REPORT
FOR FLORATECH

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*Lunaria rediviva* is native to areas throughout Europe excluding the extreme north and south. However, through introduction, *Lunaria rediviva* has established itself in regions of North America (Royal Botanic Garden Edinburgh, 2005; GRIN, 2005; USDA, 2005).

COUNTRIES

*Lunaria rediviva* can be found in the following countries in Europe: Albania, Austria, Belgium, Bulgaria, Czechoslovakia, Denmark, France, Germany, Switzerland, Spain, Hungary, Italy, Portugal, Poland, Romania, Sweden, Estonia, Latvia, Lithuania, Kaliningradskaja Oblast', Ladoga-Iilmen, Upper Volga, Volga-Kama, Upper Dnepr, Volga-Don, Ural, Moldavia, Middle Dnepr, Black Sea, Upper Dnestr (Royal Botanic Garden Edinburgh, 2005).

STATES/PROVINCES/REGIONS

*Lunaria rediviva* can be found in various mountainous regions across Europe in association with primeval forests. *L. rediviva* is found growing on areas of calcareous soils in association with deciduous broadleaf forests and in some swampy areas. The calcareous soils typically do not have strong Ca leaching, but have substantial nutrients, high organic matter contents, high degrees of humification, and neutral pHs (Antonin et al., 2005; Bükk National Park, 2005; Center for Russian Natural Conservation, 2005; Eastern Carpathian Biosphere Reserve, 2005; Jaworski et al., 2002; Lessovaia et al., 2005; Lusatian Mountain, 2005; Missouri Botanical Gardens, 2003; Nature in Lithuania, 2005; World Wildlife, 2005).

In North America, *Lunaria rediviva* can be found in the United States in the states of Utah, Pennsylvania, and Maryland and in the providence of Ontario in Canada (Government of Canada, 2005; USDA, 2005).
**TAXONOMIC DESCRIPTION**

**OVERALL PLANT HABIT/DESCRIPTION**

*Lunaria rediviva* is a herbaceous perennial that is fairly short-lived persisting for 3-5 years. It grows in sun to part-shade and will grow two to three feet (1 meter) high, and is typically taller than it is wide (Botany.com, 2005; Davis Wiki, 2005; Explore.com, 2005; Lovetoknow.com, 2005; Still, 1994).

**ROOT SYSTEM TYPE**

I could not find specific information about the root system type for *Lunaria rediviva.* However, the root system of the plants that I am growing appears to be fibrous.

**PRESENCE/TYPE OF UNDERGROUND STORAGE ORGANS**

N/A

**LEAVES**

*Lunaria rediviva* has leaves that are alternate, simple, broad-ovate with cordate leaf bases and coarsely toothed or serrated leaf margins. The upper leaves are sessile or subsessile (Still, 1994).

**FLOWERS**

*Lunaria rediviva* produces fragrant, 4-petaled violet-purple-lavender-whitish flowers borne in terminal racemes in mid-spring. In mid-summer the flowers are followed by the formation of the seedpods, from which the name money plant is derived. The seedpod is a flat elliptic silicle with satiny, paper-white or silvery septum. As the pod matures, it becomes semi-transparent through which the seeds can be seen, and this is why the plant is called ‘honesty’ (Botany.com, 2005;
Season of Bloom

*Lunaria rediviva* blooms in mid-spring to early summer from May to July (Chiltern Seeds, 2005; Dave’s Garden, 2005; Lovetoknow.com, 2005; Still, 1994).

Uses by Indigenous People

N/A

Other Uses

Besides being an ornamental, *Lunaria rediviva* could also be grown as a cut flower crop, where it could be used fresh for its delicate flowers and fragrance and dried for its attractive seedpods. *Lunaria rediviva* may also be used in attracting butterflies to the garden (Armitage and Laushman, 1993; Chiltern Seeds, 2005).

Additional Notes

N/A

Name and Description of Varieties/Cultivars on the Market

*Lunaria rediviva* ‘Partway White’ is a cultivar with pale green and white variegated foliage with white flowers. Mill Cottage Plants in the U.K. sells this cultivar. Their web address is [http://www.millcottageplants.co.uk/](http://www.millcottageplants.co.uk/) (Royal Horticultural Society, 2005).
PROPAGATION METHODS

VEGETATIVE VS. SEED

*Lunaria rediviva* can be propagated vegetatively or by seed. Currently, vegetative propagation is only used to divide crowns of established plants. The predominant method for the propagation of *Lunaria rediviva* is by seed (Hartmann et al., 2002; Toogood, 1999).

There have been various protocols written about propagating *Lunaria rediviva* by seed. One method that is recommended is to sow the seeds directly into the garden in the fall, as this would be when the seeds naturally fall from the plant. However, the American Horticultural Society recommends sowing the seeds of *L. rediviva* into the garden in the spring. There are other methods that can be used to germinate *L. rediviva* seeds in a more controlled manner. *Hartmann and Kester’s Plant Propagation* says that the seeds of *L. rediviva* will germinate in two weeks at 68°F (20°C). A different source recommends sowing the seeds at 64-71°F (18-22°C) for 2-4 weeks, moving the seeds to 24-39°F (-4 to +4°C) for 4-6 weeks, and then moving the seeds to 41-53°F (12°C) for germination. Also, in the laboratory setting, The Royal Botanical Garden, Kew found that 85% germination of *L. rediviva* is achieved through scarifying the seeds (chipping with a scalpel), germinating the seeds in 1% Agar with 250 mg/l gibberellic acid (GA3) under 26/16°C, 12/12. (Clothier, 2005; Dave's Garden, 2005; Hartmann et al., 2002; Royal Botanical Garden, Kew, 2005; Still, 1994; TooGood, 1999)

I would recommend propagating *Lunaria rediviva* by seed due to the fact that the plant readily sets seed and would make seed propagation relatively easy and economical. I would also recommend using seed since the plant appears to be short-lived (3-5 years) so the juvenile phase should also be short. However, in the future I would work on establishing protocols for
vegetative propagation, especially from stem/nodal cuttings, so that once a superior
variety/cultivar is created, it could reach the market quickly.

**IF VEG, PLANT TISSUE SOURCES**

*Lunaria rediviva* can be propagated vegetatively through the division of the crowns. The
American Horticultural Society recommended dividing the plants in the spring (Toogood;
1999).

**IF VEG, PROPOSED PROPAGATION METHOD(S) & TEMPERATURES**

As stated above, I would propose conducting trials on creating protocols for rooting
stem/nodal cuttings so that one a superior variety/cultivar is established, it could be propagated
quickly. Also, I would also recommend experimenting with the propagation of *L. rediviva* using
micropropagation, especially if it is decided to release *L. rediviva* as a cultivar. This would
again assure that market demand could be met in the future.

**IF SEED, NO. OF SEEDS/FLOWER**

From the picture of the *Lunaria rediviva* seedpods below, it appears that each flower will
produce approximately 4 seeds.

[Image: http://india.ipj.gov.pl/pars_septima/las/lun_red2.jpg]
IF SEED, SEED DORMANCY?

The literature that is currently available concerning the germination of *L. rediviva* is conflicting in its determination of seed dormancy. Some sources, like Hartmann and Kester’s *Plant Propagation*, say the seeds will germinate without any special treatments. However, other sources, like Tom Clothier’s Seed Germination Database, recommend giving the seeds a stratification treatment (Clothier, 2005; Hartmann et al., 2002).

In my own trials, I found that the seeds of *L. rediviva* do require stratification in order to germinate. I was given fifteen seeds. I divided these seeds into five groups (3 seeds/group) and gave each group a different stratification treatment: 0 weeks cold, 2 weeks cold, 4 weeks cold, 6 weeks cold, and 8 weeks cold. The seeds were given their stratification treatment by being placed in a plastic bag with moist, coarse vermiculite and were placed in a cooler (approximately 40°F). After the stratification treatment was given, the seeds were move to a mist house for germination. One of the seeds from the 6-week stratification treatment germinated, as did one of the seeds from the 8-week stratification treatment. So, it appears that the seeds of *L. rediviva* need to be stratified for at least 6 weeks. Further trials would have to be conducted to confirm this.

The seeds of *Lunaria rediviva* may also benefit from scarification. In my trials, none of the non-germinated seeds appeared to have imbibed water. Also, these seeds did not rot, which leads me to believe they possess a resistant seed coat. One source that I came across used scarification to germinate *L. rediviva* seeds. I would suggest experiments be conducted to assess the benefits of scarifying *L. rediviva* seeds to promote percent germination and yield potential (Royal Botanical Gardens, Kew, 2005).
IF SEED, GERMINATION TEMPERATURES DURATION'S

For my trials, I planted the stratified Lunaria rediviva seeds in 1804 paks. I then placed the paks the mist house, which was at approximately 70oF. For the two seeds that germinated, the cotyledons emerged as well as the first true leaves after 10-14 days. I transplanted the seedlings into 3 ½ pots about 5 days after the true leaves appeared.

During the course of my research, I could not find specific germination temperatures and duration times for Lunaria rediviva. However, I did find germination information for Lunaria annua. I believe that the recommendation for L. annua would be a place to start for germinating L. rediviva, provided that L. rediviva has been stratified. According to the Ohio Florists’ Association’s Tips On Growing Bedding Plants, L. annua should be uncovered when sown, germinated at 65-75oF during which germination will occur in 10-12 days, transplanted 16-25 days after sowing, and grown on at 60-65oF. Armitage and Laushman’s Specialty Cut Flowers recommends similar germination requirements for L. annua. They recommend sowing the seeds of L. annua at 60-75oF under mist, where germination will occur in 10-14 days. They recommend transplanting plants germinated in packs after 3-4 weeks and plants grown in plugs after 3-8 weeks into 4” pots and growing them on at 60oF night temperatures (Armitage and Laushman; 2003; OFA; 1999).

PRODUCT SPECIFICATIONS

CROP IDEOTYPE

The crop ideotype for Lunaria rediviva would consist of the following traits.

- High percent germination and High yield potential
- Short/shorter time from sowing to transplanting
- Short/shorter time from germ to flowering
- Winter-hardy
- Non-invasive
• Large, full, showy masses of flowers
• Large individual flowers
• Highly fragrant flowers
• Shatter-proof flowers
• Sturdy stems able to hold the weight of the flowers
• Large numbers of flowers = more silicles = ornamental interest through entire season
• Variety of floral shades
• Foliage variants or cultivars
• Variants in form of plant: some tall for cuts and some stockier/highly branched for gardens
• Minimal pest problems
• Adaptable to wide range of soils

MARKET NICHE-IDENTIFICATION & JUSTIFICATION

TARGET SALES DATE

The target sales date for *Lunaria rediviva* would be Mother’s Day.

POTENTIAL HOLIDAYS FOR THIS PRODUCT

*Lunaria rediviva* has marketing potential for the following holidays. It could be marketed as a bedding plant for spring/Mother’s Day sales. It could be forced year-round as a cut flower. It can be grown and sold for the dried silicles, which could be especially marketed during the fall holidays such as Halloween and Thanksgiving.

PROGRAMMABILITY

*Lunaria rediviva* could potentially be forced year-round.

CROPS WITH WHICH THIS WILL COMPETE IN THE MARKET

*Lunaria rediviva* would currently compete with a couple of plants on the market. *L. rediviva* would compete with *Hesperis matronalis* (Dame’s Rocket), since both of these plants have similar flowers and bloom times. However, Dame’s
Rocket is not very prominent in the market as a bedding plant/herbaceous perennial. *L. rediviva* could also compete with *Phlox* spp. (Garden Phlox) due to their similarity in flowers. However, *L. rediviva* blooms early in the season while Phlox blooms in summer. In both cases, *L. rediviva* could out-compete both Dame’s Rocket and Phlox because it has ornamental interest throughout the whole season.

**WHAT KIND OF “STORY” CAN BE TOLD ABOUT THIS PRODUCT**

*Lunaria rediviva* is one of the many plants having a long association with pristine, primeval forests throughout mountainous regions in Europe.

As far as marketing goes, the name honesty could be played upon. If a reliable cultivar was established, it could be marketed for its reliability, seedpods, and ornamental interest throughout the entire season with “Honesty throughout the Year.”

**WILL THIS EVER BE A MAJOR CROP?**

Honestly, I do not believe that *Lunaria rediviva* will become a “major” crop. However, I believe that *L. rediviva* does have potential to be specialty crop, particularly in the cut flower market due to its scented flowers and decorative seedpods.

**INITIAL CROP LIMITATIONS/PROBLEMS**

Experiments will have to be conducted to refine the production schedule, to test for the requirement and length of vernalization treatments, to find ways to shorten seed dormancy, and to develop superior cultivars and varieties before this crop gains market acceptance.

**IS THIS PRODUCT ALREADY IDENTIFIABLE TO THE GROWERS & CONSUMERS?**

*Lunaria rediviva* is identifiable to a small segment of growers and consumers that are familiar with *Lunaria annua.*
HOW SOON COULD THIS PRODUCT BE AVAILABLE?

It would take a while for this product to become available. This is due to the fact that there is not currently information about propagating *Lunaria rediviva* though stem cuttings or through micropropagation and establishing standards for these will take a while. Likewise, selection and bulking of seed from wild populations will take a period of time, and this time is increased if breeding is to be done to improve and select for flower color, flower size, plant form, etc. It would probably take about 5-10 years to be able to mass-release this product.

ANTICIPATED CULTURAL REQUIREMENTS

**WINTER HARDINESS (USDA ZONES)**

USDA Zone 3a (-40 to −35°F / -37.3 to –39.9°C) to Zone 9b (25-30°F/-1.2 to –3.8°C)

(Dave’s Garden, 2005; USNA, 2005)

**HEAT/DROUGHT TOLERANCE**

Currently, I would say that *Lunaria rediviva* would not be very tolerant of extreme periods of heat and drought due to the fact that it is usually quite humid and moist throughout its native distribution.

**TEMPERATURE (DAY/NIGHT)**

I would grow *Lunaria rediviva* at 70-75°F day and 60°F night temperatures, which is similar to what sources recommend for *Lunaria annua* (Armitage and Laushman; 2003; OFA; 1999).
Light Quantity, Quality, Duration, and Photoperiod Response

I would give this plant 1000-1500fc of light. I could not find information on any possible photoperiod requirements for *Lunaria rediviva*. *Lunaria annua* is known to require vernalization and not photoperiod in order to flower. It is recommended that *L. annua* be given high light intensities after vernalization to aid in faster flowering. Knowing that *L. rediviva* flowers in spring and typically grows in the understorey of trees, I would suspect that photoperiod may not be required to make this species flower as well. Therefore, I would start by trying to get *L. rediviva* to flower through vernalization treatments, but I would also suggest running photoperiod and vernalization experiments on *L. rediviva* to determine the exact requirements of this species (Armitage and Laushman; 2003).

Nutrition

It is recommended to grow *Lunaria annua* on with 100pp N using a complete fertilizer. So, I would recommend fertilizing *Lunaria rediviva* with 100pp N using a complete fertilizer, too and making adjustments as needed (Armitage and Laushman; 2003).

Soil

*Lunaria rediviva* is known to grow on calcareous soils, but these soils do not typically leach a lot of Ca and the soils typically have a neutral pH. One source said that it could tolerate a soil pH of 6.1-7.8. I would grow *L. rediviva* in a peat-lite media and try to grow it around a pH of 7, with a range that is smaller than 6.1-7.8 because there is less buffering capacity with peat-lite media than with soil (Dave’s Garden, 2005; Lessovavia; 2005).
PLANT GROWTH REGULATORS
At this time, I would not recommend using growth regulators on Lunaria rediviva, especially if it were being grown for a cut flower. However, experiments should be conducted in the future to assess the use of growth regulators on this crop if it is to be sold as a bedding plant.

CONTAINER SIZE (THROUGH PRODUCTION CYCLE)
I would recommend germinating Lunaria rediviva in a 144 or 72 plug tray. I would transplant it into a 4” for early sales or a 6” or gallon pot for later sales or cut flower production.

DISEASE RESISTANCE/SUSCEPTIBILITY
At this time, it is difficult to assess the resistance/susceptibility of Lunaria rediviva to diseases. However, Lunaria annua is known to be susceptible to the following diseases.

* Alternaria oleracea and Helminthosporium lunaria, which can cause brown/black spotting on the leaves and fruit
* Phytophthora tophthora and Rhizoctonia spp., which cause root rots
* Plasmodiophora brassicae, which causes club root

Knowing this, I would also monitor Lunaria rediviva for these diseases (Armitage and Laushman, 2003).

 FUNGICIDES, INSECTICIDES
Currently, I would not make recommendation for fungicides and insecticides to use on Lunaria rediviva, as there are most pesticides are probably not registered for this crop.

OTHER
The following are a list of insects that are known to attack Lunaria annua and should be monitored for problem on Lunaria rediviva (Armitage and Laushman, 2003).

* Leaf rollers
* Thrips
* Aphids
PRODUCTION SCHEDULE

The following is a proposed production schedule for Mother’s Day sales for *Lunaria rediviva* based on the stratification needs from my trials and based adaptations made to recommendations for the production of *Lunaria annua* (Armitage and Laushman, 2003).

![Production Schedule Table]

### NEEDS ASSESSMENT FOR GENETIC IMPROVEMENT

Genetic improvement is needed in *Lunaria rediviva* for the following:

- To overcome seed dormancy and reduce production time
- To shorten vernalization period and reduce production time
- To produce plant forms compatible with use: compact for garden or tall for cuts
Literature Cited


**TOTAL CROP TIME = 36 WEEKS**

<table>
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<tr>
<th>WEEK</th>
<th>MD</th>
<th>FBD</th>
<th>GHE</th>
<th>VERNALIZATION AND FBL</th>
<th>TRUE LVS</th>
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<th>STRATIFICATION</th>
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**LUNARIA REDVIA PRODUCTION SCHEDULE FOR MOTHERS DAY SALES**
**Your Name:** Sonya Kutz  
**Crop:** Lunaria rediviva  
**Container:**  
**Special Instructions:** started with 15 seeds  
**Seed Source:** Hortus Botanicus Nationalis #572  
**Sow Date:** Wk #: 8, 10, 12, 14, 16  
**Out of Mist House:**  
**Transpl. Date:**  
**Germination Temp.:**

<table>
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<th>SOW#</th>
<th>NAME</th>
<th>#SDS</th>
<th>G1</th>
<th>G2</th>
<th>Trns</th>
<th>FLW</th>
<th>Notes</th>
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</table>
| Wk 8 |      | 3    |    |    |      |     | 3 seeds sown uncovered in 1804 pak  
|      |      |      |    |    |      |     | -no stratification treatment was given |
| Wk 10|      | 3    |    |    |      |     | 3 seeds sown uncovered in 1804 pak  
|      |      |      |    |    |      |     | -2 weeks stratification treatment |
| Wk 12|      | 3    |    |    |      |     | 3 seeds sown uncovered in 1804 pak  
|      |      |      |    |    |      |     | -4 weeks stratification given |
| Wk 14|      | 3    |    |    |      |     | 3 seeds sown uncovered in 1804 pak  
|      |      |      |    |    | 1    |     | -6 weeks stratification given  
|      |      |      |    |    |      |     | -one seed was already at G1 when planted |
| Wk 16|      | 3    |    |    |      |     | 3 seeds sown uncovered in 1804 pak  
|      |      |      |    |    | 1    |     | -8 weeks stratification given  
|      |      |      |    |    |      |     | -one seed was at G1 when planted |
|      | 20-Apr|      |    |    |      |     | Seed with 6wk stratification at cotyledon expansion |
|      | 25-Apr|      |    |    |      |     | Seed with 6wk stratification has true leaves |