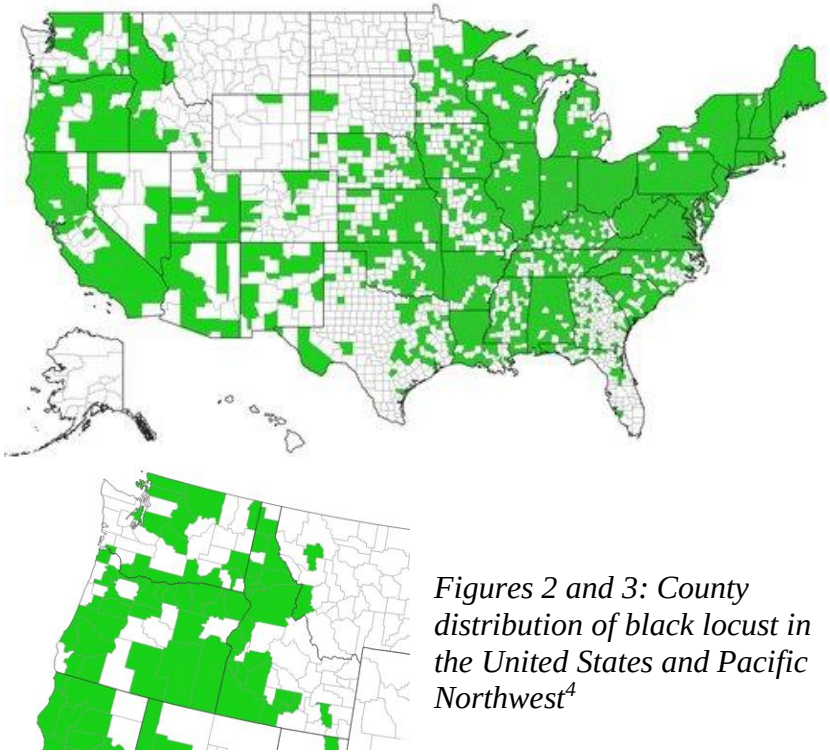
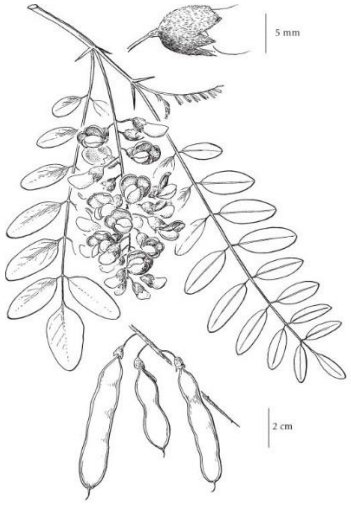
Plant Propagation Protocol for *Robinia pseudoacacia*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/2021/ROPS.pdf

Figure 1: ©1998 John Randall, Ph.D

TAXONOMY	
Plant Family	
Scientific Name	*Fabaceae*[3]
Common Name	Pea family[3]
Species Scientific Name	
Scientific Name	*Robinia pseudoacacia* (L.)
Varieties	*Robinia pseudoacacia* var. amorphifolia *Robinia pseudoacacia* var. aurea *Robinia pseudoacacia* var. bullata *Robinia pseudoacacia* var. coluteoides *Robinia pseudoacacia* var. crispa *Robinia pseudoacacia* var. dissecta *Robinia pseudoacacia* var. inermis *Robinia pseudoacacia* var. linearis *Robinia pseudoacacia* var. lutea *Robinia pseudoacacia* var. microphylla *Robinia pseudoacacia* var. monophylla *Robinia pseudoacacia* var. pendula *Robinia pseudoacacia* var. piramidalis *Robinia pseudoacacia* var. rectissima *Robinia pseudoacacia* var. rozynskyana *Robinia pseudoacacia* var. semperflorens *Robinia pseudoacacia* var. stricta

	Robinia pseudoacacia var. tortuosa *Robinia pseudoacacia* var. ulriciana *Robinia pseudoacacia* var. umbraculifera [1]
Sub-species	No information found.
Cultivar	No information found.
Common Synonym(s)	*Robinia pseudoacacia* var. rectissima (L.) Raber *Robinia pseudoacacia* var. pyramidalis Pepin *Robinia pseudoacacia* f. inermis (Mirb.) Rehder [1]
Common Name(s)	Black locust, Yellow locust, Honey locust, False acacia [1]
Species Code (as per USDA Plants database)	ROPS [3]
GENERAL INFORMATION	
Geographical range	 *Figures 2 and 3: County distribution of black locust in the United States and Pacific Northwest*[4] Black locust is native to the United States. Though its original extent is not known precisely, it is belived to have its origins in th Appalachian region. Because of its uncertain origin and behavior to outcompete other species, some counties in the Pacific Northwest like King County for example, have designated Black locust as an invasive species and/or weed. In the 17th century *Robinia pseudoacacia* was taken to Europe where it has taken hold across the continent. [7, 10]
Ecological distribution	Throughout the United States, Black locust are found in a wide variety of forest types, which can include cool temperate moist forest, warm temperate montane moist forest, warm temperate

	montane wet forest, and warm temperate moist forest life zones. In the Pacific Northwest, the Black locust is commonly found in the steppe communities of Columbia Plateau in eastern Washington and northeastern Oregon, as well as occurring in riparian communities.[10] As a species it is known to agressively invade dry/sand prairies, savannas, and disturbed woodlands in urban and rural landscapes.[1]
Climate and elevation range	The native range of *Robinia pseudoacacia* is generally classified as humid, on sites with annual precipitation between 40 to 60 inches per year. In the Pacific Northwest, Black locusts may occur anywhere from 30 to 6,500 feet (10-2,000 m).[10] The plant has had highest rates of success on the moist mountain slopes below 3,400 feet. [1]
Local habitat and abundance	Black locusts are most commonly found in early-successional habitats where there is ample sunlight because it is shade-intolerant. These areas often include low-density forests and forest edges, but can also include valley floors, bottomlands, floodplains, ridges, rolling uplands, and loess hills.[10] Black locust generally associate with black cottonwood (*P. balsamifera* subsp. *trichocarpa*), white alder (*Alnus rhombifolia*), ponderosa pine, and Douglas-fir (*Pseudotsuga menziesii*).[10] Other associations made in upland hardwood forests include black oak, red oak, chestnut oak, pignut hickory, yellow poplar, maple, and ash.[11] *Robinia pseudoacacia* are insect-pollinated (e.g honeybees) and occassionally visited by hummingbirds for their flowers between May and June in the Pacific Northwest.[10]
Plant strategy type / successional stage	Black locust trees are stress-tolerators and generalists that are able to tolerate a wide-ranges of soil types and soil pH (4.6 to 8.2), temperature (reported to withstand 104°F to -31°F), and toxins in the soil.[1] As mentioned prior, *Robinia pseudoacacia* is an early-successional species that establishes iself in environments where there is ample sunlight.[1] Many counties in the Pacific Northwest describe the plant as a weed because of its ability to quickly establish and outcompete other native plants for available sunlight and soil minerals.[10] Black locust seeds are commonly dispersed by gravity (low dispersion) and occassionally by bird species (higher dispersion). The seeds of *Robinia pseudoacacia* require scarification for successful germination, and therefore in nature can be found in seed banks under he soil for 80+ years. There are several reports available on the establishment of Black locust trees in post-fire land. [10]
Plant characteristics	Black locusts are fast-growing, broadleaved, perennial, deciduous trees part of the pea family. Mature trees average 40-

	60 feet in height and 12-30 inches in diameter, but some have been recorded at heights of 80-100 feet tall.[4] These trees have an average life span of 90 years.Their bark is light brown, rough, and becomes increasingly furrowed as they age.[3] *Robinia pseudoacacia* has rounded, oblong leaves with smooth margins with about 7-21 leaflets on a stalk. Leaves divided into ovate to oblong leaflets up to 2 inches long and 1 inch wide, rounded at the ends and with smooth margins.[10] The base of branches have thorns. This legume tree species has fragrant white flowers that come between May and June in flower fclusters. Black locusts produce flat, bean-like fruit pods, 5 inches in length, dark brown in color, and with 4-8 seeds per fruit.  *Robinia pseudoacacia* 10
PROPAGATION DETAILS (Seeds)	
Ecotype	Cumberland Gap National Historical Park, Shenandoah National Park [2]
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Bareroot (Field grown)
Stock Type	1+0 Seedling
Time to Grow	1 year
Target Specifications	Bareroot seedlings should have well-developed root systems, and will vary in height between 8-48 inches. Long roots are pruned as needed at harvest. [2]
Propagule Collection Instructions	Seeds were collected from the Parks in September and October, after pods had ripened but before they had split.
Propagule Processing/Propagule Characteristics	23,000 – 30,000 seeds / pound [2, 3] Seeds were not put in long-term storage, but there have been reports of these seeds maintaining viability for 80+ years in the soil in the wild. [10]

Pre-Planting Propagule Treatments	Cleaning: Seeds are spread out to dry. Dried pods are run through a hammermill to separate out the seed from the chaff. Storage:Cleaned seed is stored in sealed containers in a cooler at 40F and 30% relative humidity. Purity: After cleaning, purity was estimated at over 98%. Germination depends on quality of seed and seed lot and if there has been insect damage. For this propagation protocol germinaion was untested. Scarification: Prior to planting, seeds were run through a Fosburg scarifier to scratch the seedcoat and then were inoculated with rhizobia specified for *Robinia*.[2]
Growing Area Preparation / Annual Practices for Perennial Crops	Propagation environment: Bareroot seedlings are grown in outdoor woody nursery beds. Sowing date: Seeds sown in outdoor nursery beds in November, December, January, and April. No appreciable difference in production. Pre-scarified and inoculated seeds are dusted with fungicide and hand-sown into rows. Rows are 5-6 inches apart and seeds are sown about 1" apart within each row. Endomycorrhizae are sprinkled over the seed before covering it with soil. The beds are then mulched with aged sawdust, which is scraped back in the spring before seedling emergence.[2]
Establishment Phase Details	Seedlings emerge during the spring following fall sowing, or shortly after spring sowing. Newly emerged seedlings are monitored closely for irrigation needs. Seedlings are not shaded.[2]
Length of Establishment Phase	Variable.
Active Growth Phase	Outdoor woody beds: The NPMC soil is a nutrient-poor sandy loam which is amended with organic matter, such as composted leaves and manure. Seedlings in the nursery beds are fertilized every other week from early May through early June with a granular 10-10-10. From mid-June through late July, the 10-10-10 is alternated with a granular urea. Fertilization from late July through late August is bi-weekly with 10-10-10. Overhead irrigation is used after each fertilizer application. The rate of water applied is determined by soil moisture prior to irrigation.[2]
Length of Active Growth Phase	4 months[2]

Hardening Phase	Outdoor woody nursery beds: During mid- to late summer, fertilization is cut back to twice monthly. Beginning in September, irrigation is only used in severe drought situation.[2]
Length of Hardening Phase	4 months[2]
Harvesting, Storage and Shipping	Dormant bareroot plants are harvested in early to mid-December. A bareroot seedling harvester is used to lift plants in the woody bed. Seedlings are then hand-sorted by size and tied in manageable bundles. Roots are pruned as needed and kept moist until packing. Bundles are packed in plastic bins with drainage holes and roots are covered with moist sawdust. Bins are held in cold storage at 40F and watered as needed. Prior to shipment, roots of the bundles are dipped in a mycorrhizal slurry and sealed in air-tight plastic. This has prevented desiccation of roots in transport and outplanting.[2]
Length of Storage	4 months
Guidelines for Outplanting / Performance on Typical Sites	No information found.
Other Comments	This species has also been propagated by root cuttings from seedlings in the outdoor nursery beds. Clones produced from root cuttings have not been as high quality as plants from seed. Cuttings also produced large multi-stemmed plants in one season that are difficult to harvest mechanically.
PROPAGATION DETAILS (Vegetative Propagation)	
Ecotype	No information found
Propagation Goal	Plant
Propagation Method	Vegetative
Product Type	Cuttings
Stock Type	Softwood, hardwood, and root cuttings.
Time to Grow	2 years[3]
Target Specifications	Plants 24-36 inches with esablished root systems
Propagule Collection Instructions	6-12 inch hardwood cuttings during dormancy is most effective from December to March.[3] Alternatively, 2” inch cuttings (at least-thumb thickness) from the roots.[5]
Propagule Processing/Propagule Characteristics	No information found.
Pre-Planting Propagule Treatments	Store cuttings in cool, dry sand for three weeks before planting.[11] Apply root-inducing hormonal chemicals.[3]
Growing Area Preparation / Annual Practices for Perennial Crops	Well-draining potting mix, equal parts perlite/peat moss and coasrse sand in 5-gallon pots. 5 cuttings per foot (~2 inches between cutting). Maximize direct sunlight available to cuttings.[9]
Establishment Phase Details	Place cutting so only the top cut is only slightly below ground level. Lightly water (2-3 inches) when first planted, then keep permanently moist.

Length of Establishment Phase	No information found.
Active Growth Phase	When propagating plants from root pieces, the appearance of plantlets can be expected 20-25 days after cutting. [9]
Length of Active Growth Phase	No information found.
Hardening Phase	No information found
Length of Hardening Phase	No information found
Harvesting, Storage and Shipping	No information found
Length of Storage	4 months.
Guidelines for Outplanting / Performance on Typical Sites	No information found
Other Comments	Clonal propagation is thought to be a more common means of reproduction than seed because Black locust commonly sprouts from roots or the stump in response to stem or root damage due to cutting, fire, wind, or disease.

INFORMATION SOURCES	
References	Attached.
Protocol Author	Brenton Riddle
Date Protocol Created or Updated	05/24/2021

References

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