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ORNAMENTAL MADWORTS (*ALYSSUM*) AND THE CORRECT NAME OF THE GOLDENTUFT ALYSSUM

MANY of the standard horticultural reference works list the "Madworts" as a group of annuals, biennials, perennials or subshrubs in the family Cruciferae, which with the exception of a few species, including the goldentuft madwort, are not widely cultivated. The purposes of this article are twofold. First, to inform interested gardeners, horticulturists and plantsmen that this exception, with a number of cultivars, does not belong to the genus *Alyssum*, but because of certain critical and technical characters, should be placed in the genus *Aurinia* of the same family. The second goal is to emphasize that many species of the "true" *Alyssum* are notable ornamentals and merit greater popularity and cultivation.

The genus *Alyssum* (now containing approximately one hundred and ninety species) was described by Linnaeus in 1753 and based on *A. montanum*, a widespread European species which is cultivated to a limited extent only. However, as medicinal and ornamental garden plants the genus was known in cultivation as early as 1650. The name *Alyssum* is of Greek derivation: *a* meaning not, and *lyssa* alluding to madness, rage or hydrophobia. Accordingly, the names Madwort and *Alyssum* both refer to the plant's reputation as an officinal herb. An infusion concocted from the leaves and flowers was reputed to have been administered as a specific antidote against madness or the bite of a rabid dog. Some sources have suggested the use of alyssum tea as a sedative for allaying anger. Mr. H. W. Shimer, author of *Origin and Significance of Plant Names* (1943), has indicated that *alyssum* was used by the Greeks as a remedy for hiccoughs. There is some evidence that a weedy annual native throughout southern and central Europe and naturalized in some areas of North America (*A. alyssoides*, often incorrectly known as *A. calycinum*), was the plant called "Heal-bite" or "Heal Dog" and originally responsible for the common epithet of "Madwort".

Although "*Alyssum saxatile*", a native of Turkey, and central and southwestern

Europe, extending north to Poland and east to the Caucasus, has been known in cultivation many years prior to its description by Linnaeus in 1753, it was not until 1814 that the French botanist Desvaux, after a comparative study, concluded that it stood quite apart from, and was only remotely allied to, the other species of *Alyssum* known at that time. Accordingly, he assigned "*Alyssum saxatile*" to a new genus which he called *Aurinia*, and the botanical name became *Aurinia saxatilis*. At the same time, Desvaux transferred the sweet alyssum to *Lobularia*, another new genus, making it *Lobularia maritima*. Whereas the name *Lobularia maritima* for this popular ornamental annual has become widely accepted by plantsmen, the designation *Aurinia saxatilis* has not.

Approximately twenty years after Desvaux's application of *Aurinia*, the German botanist K. Koch accepted the evaluation of its distinction from *Alyssum*, but not at generic rank. He established *Aurinia* as an anomalous section within *Alyssum*, having little natural affinity with the other six cognate sections. Although *Aurinia* is composed of a relatively homogeneous group of seven species only remote relationships may be traced with the other sections which show clear lines of affinity amongst themselves. *Aurinia* certainly appears to be more closely allied to *Berteroa* or *Alyssoides* (previously known as *Vesicaria*) than to *Alyssum*. Unfortunately, Koch's appraisal of *Aurinia* as a section within *Alyssum* has been generally followed up to the present time, with the exception of several Russian Floras in which generic separation has been maintained.

The delimitation of genera in this family, the Cruciferae, is notoriously difficult, mainly because of its morphological unity and overall naturalness. Due to this, the determination and delimitation of genera is dependent on different combinations of numerous and often very technical details. *Aurinia* may thus be distinguished from *Alyssum* by the following diagnostic differences.

AURINIA: densely tufted basal rosettes of more or less erect leaves rarely shorter than two inches and usually three to six inches long, and provided with sinuate or dentate, or pinnatifid margins (like an oak leaf); fleshy and swollen bases, of the long and always deeply grooved petioles of the rosette leaves, long persistent (five years or more) on the indurated caudices; cauline leaves (leaves of the flowering stem) one half or less the length of the rosette leaves, and sparse; flowering stems often appearing leafless or scapose shortly after anthesis; fleshy bracts tightly adpressed to and folded around developing inflorescence; flower buds globose, as broad as long; calyx cup-shaped, the sepals spreading more or less horizontally at anthesis; stigmas conspicuously bilobed, especially when immature.

The contrasting characters of *Alyssum* are: laxer rosettes (never tufted) of sterile shoots with more or less spreading or appressed leaves, rarely longer than one inch and usually less, and provided with entire margins; all leaf petioles terete or slightly flattened (never grooved), gradually attenuate and without long persistent swollen bases; cauline leaves more or less equal in size to leaves of sterile shoots; flowering stems foliate during growing session; inflorescence bracts

spreading or deflexed, never adpressed; flower buds oblong and elliptic, generally twice as long as broad; calyx elongate, the sepals erect at anthesis; stigmas globose, never conspicuously bilobed.

It is hoped that the morphological details listed above will clarify the taxonomic distinction of *Aurinia* from *Alyssum*, and that future technical and popular botanical and horticultural literature, as well as seedsmen and nurserymen who stock and distribute "*Alyssum saxatile*", will accept and adhere to the resurrection of the genus *Aurinia*, and refer to the "Goldentuft Madwort" as AURINIA SAXATILIS.

Another aspect of this is that a number of cultivars pertaining to "*Alyssum saxatile*" have been described with Latin names, but in accordance with the 1961 *International Code of Nomenclature for Cultivated Plants* (Article 16) such names must be altered to agree in gender with the Latin generic name, with the result that "*Alyssum saxatile*" 'Citrinum', 'Compactum', 'Compactum Plenum', 'Luteum', 'Plenum', 'Sulphureum', 'Variegatum', etc. must become *Aurinia saxatilis* 'Citrina', 'Compacta', 'Compacta Plena', 'Lutea', 'Plena', 'Sulphurea', 'Variegata', etc.

Commercial plantsmen, as well as private gardeners, are often disturbed, even irritated, by the apparently numerous name changes which the botanical and horticultural taxonomists attempt to impose on widely cultivated plants. *Alyssum* forcefully illustrates this problem. The incorrect naming of many of the cultivated species may be due to the taxonomic and nomenclatural difficulty of the genus, to the perpetuation of errors in identification, and to the contamination of seed. *Aurinia saxatilis*, which has been known and cultivated as "*Alyssum saxatile*" for over two centuries illustrates how reappraisals are made by taxonomists. Any such evaluation is subject to varying amounts of criticism, of course; however, the estimate of natural relationships and affinities implicit within biological classifications is always, or should be, formulated after a careful analysis of all pertinent and available facts (such as morphology, chromosome number, breeding mechanisms, distributional ranges, etc.).

Nomenclatural name changes, in contrast to those dependent on taxonomic judgements, are somewhat more clear-cut, dictated as they are by the International Codes of Botanical and Horticultural Nomenclature. This type of name change in *Alyssum* is exemplified, among many, by the highly decorative, tall-growing, perennial species known commercially as "*A. argenteum*". Correctly this plant should be called *A. murale*, because of the name priority of an earlier described *A. argenteum*, which unquestionably is distinct from the plant known in cultivation. The history of this confusion is easy to trace. In 1790 F. Vitman described a widespread species, native to central, southern and eastern Europe, and throughout most of the Levant, and named it *A. argenteum*. Nine years later, in 1799, Graf von Waldstein and P. Kitaibel described a plant, originally collected in Transylvania, and called it *A. murale*. After several years of confusion

it was recognized that Vitman's *A. argenteum* and Waldstein & Kitaibel's *A. murale* were conspecific and represented the same species. Consequently, since different epithets may not be used for the same species, one has to be chosen as correct. According to the *International Code of Botanical Nomenclature* the oldest valid name should be used. *A. argenteum* (1790), being published before *A. murale* (1799), would have priority but for the fact that Carlo Allioni, in 1774, had already described a rare species endemic to the Piedmont region of Italy as *A. argenteum*. Because of this, Vitman's *A. argenteum* (1790) is itself a later use of the same epithet, a homonym, and his application of the name cannot be used. So, although the species is widespread and commonly cultivated by this name, it must become *A. murale* (1799) by the use of the later epithet of Waldstein & Kitaibel, with Allioni's rare species taking priority for the name *A. argenteum* (1774).

The incorrect naming of cultivated alyssums through misidentification is a serious problem. It is estimated that 50% of the seeds or plants offered in commercial catalogues and through botanic garden seed lists are, for various reasons, incorrectly named. Likewise, the use of taxonomically or nomenclaturally incorrect names is very evident in many of the standard and popular horticultural references. The following are a few examples of errors of generic and specific recognition commonly met with among cultivated alyssums.

Incorrect	Correct
<i>Alyssum arduini</i>	<i>Aurinia saxatilis</i>
<i>Alyssum calycinum</i>	<i>Alyssum alyssoides</i>
<i>Alyssum corymbosum</i>	<i>Aurinia corymbosa</i>
<i>Alyssum creticum</i>	<i>Alyssoides cretica</i>
<i>Alyssum edentulum</i>	<i>Aurinia petraea</i>
<i>Alyssum gemonense</i>	<i>Aurinia petraea</i>
<i>Alyssum lagascae</i>	<i>Alyssum purpureum</i>
<i>Alyssum longicaule</i>	<i>Hormathophylla longicaule</i>
<i>Alyssum maritimum</i>	<i>Lobularia maritima</i>
<i>Alyssum minimum</i>	<i>Alyssum desertorum</i>
<i>Alyssum orientale</i>	<i>Aurinia saxatilis</i> subsp. <i>orientalis</i>
<i>Alyssum petraeum</i>	<i>Aurinia petraea</i> (Plate XIV)
<i>Alyssum podolicum</i>	<i>Schivereckia podolica</i>
<i>Alyssum sinuatum</i>	<i>Alyssoides sinuata</i>
<i>Alyssum speciosum</i>	<i>Alyssum atlanticum</i>

The category of misidentification is further complicated by different sources offering seeds or plants of several distinct species under the same name. For example, "*Alyssum rostratum*" in the trade usually is either *A. montanum* or *A. repens*, but never the true annual *A. rostratum*, which has little ornamental promise.

The inclusion of some names in horticultural literature is highly dubious, due probably to the misidentification of herbarium specimens. Species such as *A. persicam*, *A. floribundum*, *A. troodii*, *A. idaeum*, among many others, are frequently listed as being cultivated, but they are very rare even on their natural environment, and it is extremely doubtful if they have ever been introduced into cultivation. *A. persicum* from the Iranian plains would be a very desirable ornamental, however, it has been collected only twice, both collections without seed! Occasionally, names are treated as synonyms in reference works when actually they are applicable to taxonomically distinct species. *A. diffusum* is often incorrectly called a synonym of *A. montanum*; *A. bertolonii* of *A. argenteum*; and *A. atlanticum* of *A. montanum*. A number of encyclopedic horticultural references incorporate the genus "*Ptilotrichum*" containing several species. This genus should not be recognized as a distinct group for the components previously assigned to it have been transferred to other genera in the Cruciferae, including *Alyssum*. One such plant is "*Ptilotrichum spinosum*", which is *Alyssum spinosum*.

While investigating the taxonomy of Turkish and European *Alyssum*, I became very impressed by their immense ornamental potential as rock garden plants, bedding and edging plants, ground covers, bank plantings etc., and the lack of any significant popularity in the United States, although some enthusiasm is sponsored by the American Rock Garden Society. Many more species and clones are available in Europe, possibly due to a greater emphasis in rock gardening. With the idea of initiating more interest in this neglected group of ornamentals, a trial plot of over thirty types, resulting from approximately one hundred different lots of seed, was established in 1964 at the Case Estates of the Arnold Arboretum. This trial plot or "Alysetum", as it was nicknamed, was also initiated to fulfill the following additional goals. 1, To test the hardiness of predominantly southern European and Anatolian species in the New England climate. It has long been assumed that *Alyssum* (and other groups, as well) from these areas would not survive the northeastern climate. The results, however, were very heartening, and an estimated 85% to 90% of the trial plants survived the winter of 1964-1965. 2, To evaluate the ornamental potential of a number of different species and clones. 3, To compare and evaluate the morphological variation and taxonomic criteria of cultivated material with that of wild origin. 4, To test the identity of seed offered from numerous sources.

From the ornamental viewpoint the trial plot was indeed highly satisfactory (Plate XV). The perennials were the most interesting horticulturally, and some species (such as *Alyssum scardicum*), planted in June, actually began to flower sporadically in September of the same year. The blooming season of these plants is long compared with many other perennial groups. In the spring of 1965 some of the procumbent species began to flower as early as mid-April, and flowering was extended through August by the taller subshrubs. Although the predominate flower color in the genus is yellow, with hues from very pale to deep orange yel-

low, there are a few white and violet-pink flowered types. Foliage color offers a great deal of interest, ranging from deep green to ashy-gray, and a number of the cushion-forming species are silvery and somewhat shiny in appearance. Most of the perennial alyssums have a desirable winter rosette phase that remains green throughout the dormant season. The habit ranges from very prostrate creepers or trailers, often forming plants only three or four inches in height and diameter, to dense cushion-forming types in which these dimensions are approximately two feet; under optimum conditions they may become three or four feet in the erect subshrubs. Finally, a few species native to the Near East have very attractive large samaroid and pendulous fruits which rustle in a breeze, similar to those of Honesty or *Lunaria*.

The alyssums are easily propagated from seed or cuttings. Seed, which may be viable for as long as five years, may be sown in the open in April or May, or started inside in March; and the young plants then transplanted after frost danger has passed. If a wider area is to be covered, the broadcasting and raking of the seed into the soil would be effective. Alternatively, cuttings taken in the spring from young shoots will root readily in about two weeks if maintained under humid conditions and sheltered from direct sunlight. A sunny location with well-drained, light or sandy, and neutral or slightly basic soil is advantageous for the best flowering. Some species, however, such as *Alyssum repens*, which in its natural environment is often found along river banks, will thrive with less sun and in a richer loamy soil. As a rule, however, a mineral, sandy or gravelly, well-drained soil is more conducive to flowering than a heavy organic soil. This feature makes the alyssums particularly desirable for use on banks and slopes, and being plants primarily from Mediterranean regions, once established, they will naturally survive fairly extensive periods with a minimum of moisture. If it is thought, after flowering, that the spikes of fruit are unattractive, the plant may be sheared. This shearing will promote the spread of the plant, initiate a denser winter rosette stage, and often induce a second flush of flowers. None of the plants grown at the Case Estates during the past two years was apparently susceptible to insect or disease infestations.

The following is a descriptive list of a few of the more desirable perennials which are available commercially* or through such agencies as the American Rock Garden Society.

Alyssum alpestre: Procumbent and mounded, woody at the base, two to three inches tall; evergreen leaves obovate-oblong, whitish-silvery and very dense on slender stems; flowers pale yellow, profuse, in short simple racemes; fruits elliptic, white, pubescent. April-June. Central and western Alps. Recommended for scree and rock gardens.

* Harry E. Saier, Dimondale, Michigan; American Perennial Gardens, Garden City, Michigan; Tucker and Sons Perennial Gardens, Belleville, Michigan; Thompson and Morgan, Ltd., Ipswich, England; Correvon Fils, Geneva, Switzerland.

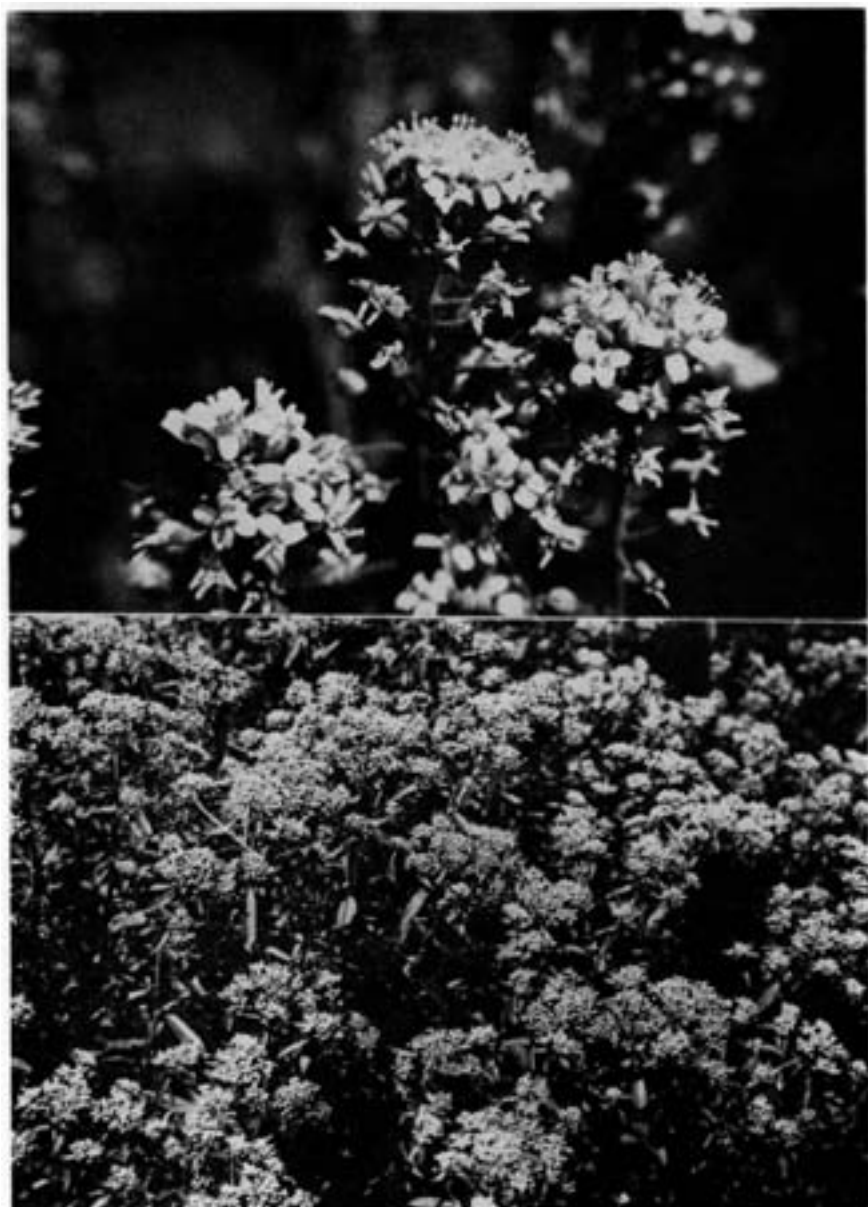


PLATE XIII

Upper; *Alyssum montanum*, June 1, 1965. Lower: *Alyssum murale*, June 5, 1965.

Alyssum atlanticum: Dense caespitose subshrub, four to twelve inches tall; evergreen leaves spatulate or lanceolate, more or less imbricated along stout stems. Often confused with *A. montanum*, but distinguished by stricter and stiffer flowering stems; grayish or silvery foliage and stems; shorter and more crowded racemes; larger, deeper yellow flowers. May–July. Southern and eastern Spain, and North Africa.

Alyssum bertolonii: Subshrub, up to twelve inches tall, flowering stems ascending. Similar to *A. serpyllifolium*, but differing with lower surface of leaves silvery-white, upper greenish; larger and deeper yellow flowers; glabrous or sparsely pubescent fruits. June–August. Italy and the western Balkans. (Often cultivated as *A. argenteum* or *A. murale*.)

Alyssum borzaeanum: Erect or ascending, six to fifteen inches tall, woody at the base; dense basal rosette of ashy or white-tomentose obovate to orbicular leaves; flowers bright yellow, in large multibranching, terminal corymbs; fruits small, orbicular and with sparse indumentum. June–August. Black Sea coast of Bulgaria, Romania, and rarely, western Turkey.

Alyssum cuneifolium: Caespitose, mound-forming, two to six inches tall; very dense silvery, or white, rosettes of sterile shoots; flowering stems lax and tortuose, somewhat trailing; flowers very large and bright yellow; fruits elliptic, densely gray pubescent. Late May–August. Southern European mountains. (Often grown as *A. condensatum* or *A. idaeum*.)

Alyssum diffusum: Diffuse and sprawling with long trailing, prostrate or procumbent sterile shoots; flowering stems four to ten inches long, at first ascending then lax. Similar to *A. montanum*, but differing with greener, narrower and always acute leaves; paler colored flowers; and usually smaller fruits. April–June. Mountains of Italy, southwestern Alps, Pyrenees, and northern Spain.

Alyssum lapeyrousianum: Stout subshrub with coarse flowering stems fifteen inches tall, and silvery leaves. Similar to *A. spinosum*, but differing by laxer, spineless branches; white flowers twice as large; elongate and lax inflorescences; and larger fruits. June–August. Eastern Pyrenees and eastern Spain. (Occasionally cultivated as “*Ptilotrichum*” or *Alyssum peyrousianum*, and *Alyssum pyrenaicum*.)

Alyssum markgrafii: Erect, twelve inches tall; leaves narrowly linear or spatulate; flowers bright yellow, in dense corymbs. Similar to *A. murale*, but having a more delicate appearance and smaller, glabrous fruits. May–July. Albania and Jugoslavia.

Alyssum moellendorffianum: Dwarf and caespitose, two to six inches tall and wide; orbicular-ovate leaves, very silvery on both sides; yellow flowers in short



PLATE XIV

Upper: *Alyssum scardicum*, April 10, 1965. Lower: *Aurinia petraea*. June 3, 1965.

dense racemes; fruits orbicular and silvery. Late May–July. Western Jugoslavia (Bosnia). One of the finest.

Alyssum montanum: Dense, mat-forming, two to ten inches tall, with procumbent and trailing sterile shoots, and ascending or spreading flowering stems; evergreen leaves obovate-oblong, predominately ashy-white; flowers very fragrant, usually bright yellow, but sometimes pale, simple, or sparingly branched, dense corymbs; fruits white pubescent. The lowland form, subsp. *gmelinii*, of sandy substrates in eastern Europe, with stiff and longer flowering stems is more desirable perhaps because of a denser growth habit. April–August. Very variable, most of Europe, except in the northern and southwestern regions.

Alyssum murale: Subshrub with crowded and erect flowering stems up to two feet tall, subtended by dense and spreading rosettes of evergreen sterile shoots; oblong-spathulate to linear-oblong leaves, greenish above and silvery or white below; flowers deep golden yellow in widely spreading, strongly branched flattish corymbs; fruits orbicular and flat, often undulated, indumentum variable. June–September. Very variable. Southeastern and central Europe, and throughout the Levant. (Widely cultivated as *A. argenteum*, and occasionally as *A. chalcidicum*.) A very attractive, long flowering and long-lived, species suitable for permanent perennial plantings or as a ground cover.

Alyssum ovirens: Procumbent or prostrate trailer attaining a maximum of six inches in height and diameter; fleshy leaves obovate-spathulate or orbicular, obtuse, silvery; flowers golden, in large loose corymbs; fruits obovate and sparsely pubescent. June–August. Southeastern Alps and western Jugoslavia. (Often incorrectly called *A. wulfenianum*.)

Alyssum purpureum: Dwarf, caespitose and densely conferted, one to four inches tall, often forming large mats; leaves very slender and silvery-white; flowers purple; fruits oblong and sharply pointed, with dense, ashy or white, tomentose indumentum. Late April–July. Southern and southeastern Spain. (Some sources list this as “*Ptilotrichum*” *purpureum*.) Ideal for edging purposes.

Alyssum repens: Diffuse trailer with ascending and erect flowering stems up to two feet tall, woody at the base; leaves greenish, oblong-obovate to lanceolate, acute; large orange-yellow flowers in long racemes; fruits orbicular or obovate, and pubescent. Subspecies *trichostachyum* from the Balkans, Crimea, Turkey and the Caucasus is the tallest form with stout and erect flowering stems more or less densely covered with long spreading strigose hairs; subspecies *transsilvanicum* from Romania and northern Greece is intermediate, with slender tortuose flowering stems, shorter racemes, and smaller fruits. May–July. Very variable. Southeastern and east-central Europe, extending into Turkey and Caucasia. (Occasionally confused with *A. montanum*, but easily distinguished by the strigose, spreading hairs on the pedicels.)

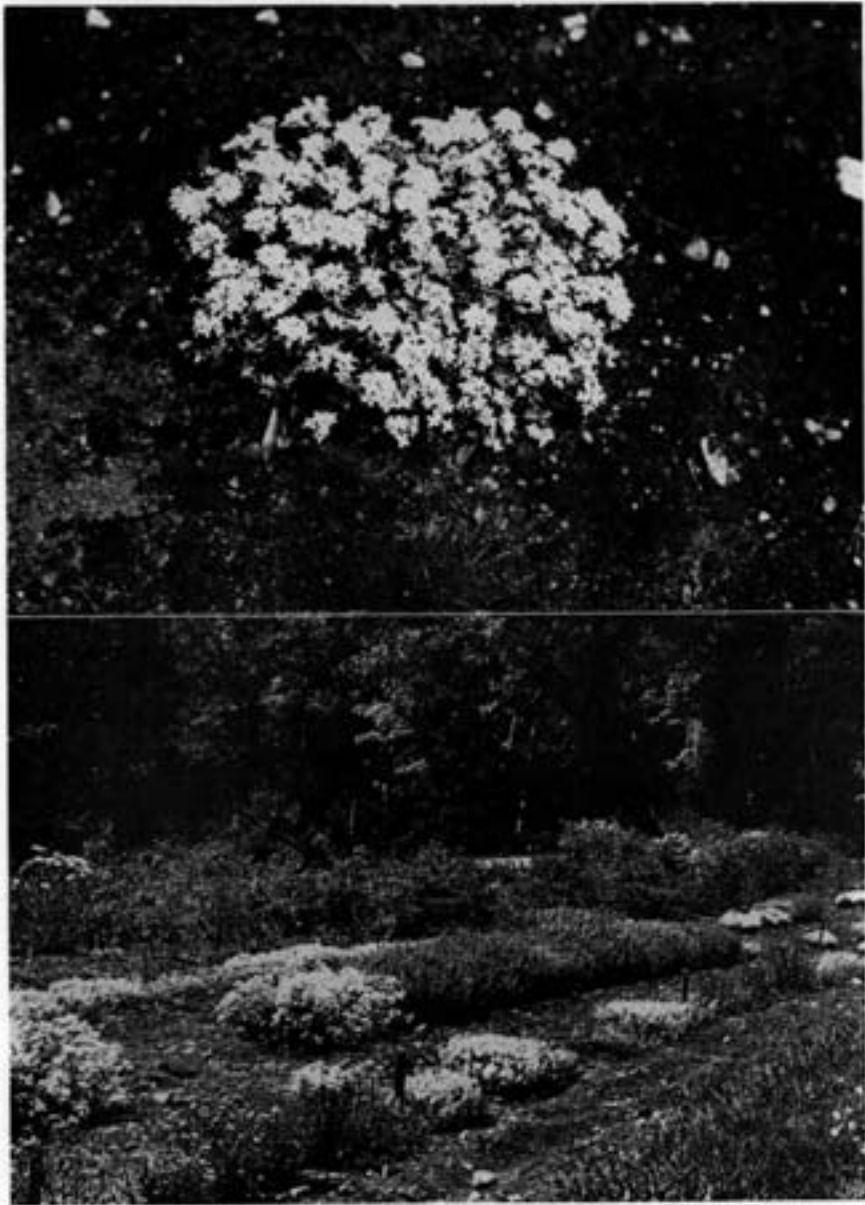


PLATE XV

Upper: *Alyssum spinosum*, May 20, 1965. Lower: View of *Alyssum* trial plot at the Case Estates of the Arnold Arboretum, May 20, 1965.

Alyssum scardicum: Diffuse, with trailing ashy-gray stems, forming a loose mat up to ten inches tall and spreading to one or two feet. Similar to *A. wulfenianum* but differing by narrower leaves; larger, deeper colored flowers, in dense clusters, which greatly elongate in fruit; and smaller fruits, with more or less dense indumentum. April-June. Albania, Bulgaria and Jugoslavia.

Alyssum serpyllifolium: Procumbent or erect, up to twelve inches tall, with dense basal rosettes of erect, evergreen, sterile shoots from a strongly branched woody stock; leaves spatulate, folded, whitish or silvery on both sides; flowers pale yellow in compact clusters; fruits elliptic and silvery. June-August. Southern France, Spain, Portugal and North Africa. (Much of the *A. serpyllifolium* offered commercially represents the annual *A. alyssoides*; also cultivated erroneously as *A. alpestre*.)

Alyssum spinosum: Cushion-forming, rounded shrub with interlacing, white or silvery spiny branches, attaining a maximum of two or three feet in diameter and height; leaves oblong-oblancoate to lanceolate, whitish-silvery; flowers fragrant, white, in compact, umbellate clusters; fruits obovate and glabrous. Cultivar 'Roseum' is of dwarfer habit with violet flowers fading pinkish. May-July. Southern France, eastern and southern Spain, and North Africa.

Alyssum stribrnyi: Spreading and woody at the base, up to ten inches tall and two feet in width; foliage and stems very silvery; petals very large, bright orange-yellow; fruits oblong-orbicular and densely canescent. May-June. The eastern Balkans and European Turkey. (Often cultivated as *A. mildeanum*.)

Alyssum tortuosum: Procumbent to ascending, three to fifteen inches tall, rarely up to two feet; base woody with few erect, and grayish, sterile shoots; flowering stems twisted or tortuose, often lax at maturity; leaves narrowly oblanceolate to lanceolate, grayish green; bright yellow flowers in wide, strongly branched, corymbs; fruits small and gray pubescent. June-August. Central, eastern and southeastern Europe, extending to Turkey, Caucasia and as far east as the Altai.

Alyssum wulfenianum: Procumbent, with ascending flowering stems, up to ten inches tall; dense, basal rosettes, of grayish or whitish sterile shoots; leaves of flowering stems greenish, oblanceolate and acute; fruits large, sparsely pubescent. Confused with *A. ovirens*, but differing by smaller, paler flowers in short corymbs; leaves which are always acute and greenish; and larger fruits. June-July. Southeastern Alps.

A large number of additional species, which are of equal or even more ornamental value, should be brought into cultivation. Among many, some of these are *Alyssum idaeum*, *A. lassiticum* and *A. sphacoticum* from Crete; *A. akamasicum* and *A. troodi* from Cyprus; *A. lanceolatum* and *A. persicum* from Persia and Afghan-

istan; *A. doerfleri*, *A. euboicum*, *A. handelii*, *A. heldreichii*, *A. smolikanum* and *A. taygeleum* from Greece; and *A. aizoides*, *A. argyrophyllum*, *A. caespitosum*, *A. caricum*, *A. cassium*, *A. floribundum*, *A. paphlagonicum*, *A. peltarioides* and *A. praecox* from Turkey (the current center of diversity of the genus). The introduction of even a few of these species would greatly enrich horticulture by increasing the number of long-blooming, and versatile, perennials currently available.

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