

Phenotypic Variations of *Erigeron strigosus* Muhl. (Compositae) in Eastern Texas

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In Texas, *Erigeron strigosus* Muhl. shows great variation, having: (1) spring forms which frequently resemble *E. tenuis* T.&G. and which have strigose, usually scanty pubescence; (2) taller summer forms with dense, predominantly spreading pubescence; and (3) autumn forms of tall plants having conspicuous basal rosettes. The features of each of these seasonal variants are shown in the chart below:

GROUP I	GROUP II	GROUP III
STEM 19-60 cm. high (rarely to 82 cm.), often very thin; strigose, often thinly pubescent	STEM 65-113 cm. high (rarely as short as 45 cm.), thick and stout; commonly densely gray-pubescent with mostly spreading hairs	STEM 50-90 cm. high (mostly over 60 cm.), heavy and stout; pubescence variable
LEAVES usually thinly pubescent with stiff, strigose hairs often appearing rough to the touch; entire or toothed, frequently shallowly lobed; basal leaves often present	LEAVES always densely pubescent with short, flexible, extremely slender hairs, feeling silky-smooth to the touch; entire or slightly toothed, never lobed; basal leaves absent or inconspicuous at flowering time	LEAVES usually densely pubescent, rough to the touch; toothed; basal leaves prominent
PEDUNCLES usually thinly and strigosely pubescent; seldom densely so	PEDUNCLES heavily to densely pubescent; pubescence usually hoary, concealing the peduncle	PEDUNCLES usually intermediate between Groups I and II
Chalk hills, clays, and sands	Sandy soils only	Sandy soils only
Flowering March 22-June 14 (mainly April and May)	Flowering April 15-July 19 (mainly June)	Flowering Aug.-Nov.

Group I The many highly variable forms composing this group often have one or more of the features associated with *E. tenuis*, such as early flowering (*tenuis* flowers March 11-May 20); fewer heads and slender, less-branched stems; basal leaves present at flowering time; wider leaves; toothed and often lobed lower leaves; and curved stem base. Most of the early flowering forms of this group of *strigosus* are short and thin-stemmed, while nearly all of the late May and early June forms are stouter, taller, and have less resemblance to *tenuis*. The following Key will separate *E. strigosus* from *E. tenuis*:

Stems 1-4 dm. high; rays from pale to light lavender-blue; pappus of both the ray and disk florets containing slender bristles *E. tenuis*

Stems 2-10 dm. high; rays white (rarely pale lavender-blue); pappus of disk florets of slender bristles, those of ray florets a minute fringed scale only *E. strigosus*

These forms of *strigosus* are found over most of eastern Texas, from the Louisiana and Arkansas borders westward to the counties of Wichita, Hamilton, and Bastrop, south to DeWitt and Jefferson. *E. tenuis* is found over all of east Texas sands as far west as Dallas and Brazos counties.

Group II This group is easily discernible by its distinctive pubescence (of extremely fine, short, soft, white hairs), most of these spreading rather than strigose (especially typical of upper leaves and peduncles). These often give the plant an ashy-gray appearance. Plants of this group are further characterized by being more uniform, taller, stouter, and later-flowering than those of Group I. Often specimens of Group I and of Group II are found in the same vicinity; in such cases plants of Group I will display many heads

already seeding, while those of Group II will show most heads yet in bud. Plants of this group extend from Bowie and Cass counties, west to Wise, and south only to Dallas, Henderson, and Panola counties.

Group III Plants of Group III are distinctive in their late flowering and predominance of basal leaves. Specimens from Grayson, Nacogdoches, Upshur, and Wood counties only.

The close resemblance of many early spring forms of *E. strigosus* to those of *E. tenuis* suggests free hybridization between the two. Occasionally, plants of *E. strigosus* can be clearly differentiated from *E. tenuis* only by the examination of the pappus of the ray florets (see-Key above). The main evidences of hybridization are: (1) the many morphological similarities shared by *tenuis* and these early forms of *strigosus* (see discussion of Group I above); (2) the fact that, although *strigosus* flowers throughout the spring, summer, and autumn, only those form flowering at the same time as *tenuis* have any great resemblance to *tenuis*; (3) during the early spring when *tenuis* is flowering, *strigosus* is extremely variable in most of its features, while during the late spring and early summer when *tenuis* is no longer in flower, *strigosus* is rather uniform in its features; (4) restriction of many forms of *strigosus* to the sandy habitat of *tenuis*. There is a probability that introgressive hybridization can account for the unusual situation of *E. strigosus* in Texas. Cronquist (1947) has mentioned the fact that *E. strigosus* is an apomictic species; this may account for the uniformity of late spring and early summer plants. The unusual type of pubescence of Group II may exemplify both introgressive hybridization and apomixis.

SUMMARY

1. In eastern Texas, *Erigeron strigosus* Muhl. is an extremely variable species. The variations fall into three groups:

2. Group I is characterized by short stems, early-flowering, scanty pubescence, and often lobed lower leaves — all peculiarities of *E. tenuis* T.&G., found over much of the same area and flowering at about the same time. Plants of this group show great variation. This fact, and the resemblances to *E. tenuis*, suggest that introgressive hybridization has produced a population of *E. strigosus* heavily contaminated genetically by *E. tenuis*.

3. Group II is characterized by taller stems, later flowering, fine very dense pubescence, and restriction to the sandy soils of northeast Texas and adjacent Arkansas. Plants of this group are very uniform. The geographic limitation and the uniformity suggest that this is an endemic race maintained by apomixis, which has been reported in *E. strigosus* (Cronquist, 1947).

4. Group III is characterized by still later flowering, usual presence of numerous basal leaves at flowering time, scabrous pubescence, and restriction to sandy soils.

LITERATURE

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Porcellio quadriseriatus (Isopoda) at Dallas, Texas

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The eastern Mediterranean species, *Porcellio* (*Proporcellio*) *quadriseriatus* Verh. (which for some years has been locally very abundant near Southern Methodist University at Dallas), was first found in the summer and fall of 1925 in a rubbish- and stone dump on a corner of the campus.² Again in 1927 I found it abundant in a restricted distribution, and sent a dozen individuals (from a collection of several hundred) to the American Museum of Natural History and the U.S. National Museum. In June and July of 1928 (repeated in 1929 and 1930) I again collected several hundred specimens from a compost heap on the campus, as well as in the University greenhouse. Many of the females contained young in their brood-chambers. As the species with us is minute and very active, most of my collections were taken with potato traps (Geiser, 1928), without loss of even very young and juvenile forms. More than a thousand individuals of this species were found in the above-mentioned localities during the last two weeks of May, 1932. All were "sexed" to learn the sex-ratio, and representative samples of the two sexes were measured (Table I.) Many gravid females of the collection were also examined to determine the size of representative broods (Tables II, III).

In June, July, and September of 1936 I again found this species, this time in a mule barn east of the University power plant. I measured some thousand specimens of this collection (Table IV). Representative gravid females were again studied from those collections to ascertain brood-sizes; the data are summarized in Table II.

Verhoeff (1917, p. 167) described this species from the type locality of Rehoboth near Jaffa, Palestine. In his 1923 paper (p. 225), Verhoeff gave measurements of the species as follows: 'males from Rehoboth (7.5 mm.) and Chuldah (9.5 mm.), and a young female from Rehoboth (4.5 mm.)' His measurements exceed greatly my usual findings for this species (as will be seen from my tables, especially Table IV).

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²See Geiser (1933, pp. 29-30), and Van Name (1936, pp. 236-38).