A NOTE ON THE OCCURRENCE OF "ANOMALOUS" KRASNOZEM IN THE RICHMOND-TWEED REGION OF NEW SOUTH WALES.

By J. W. McGarity and D. N. Munns.

(Communicated by Dr. W. R. Browne.)

(Plate viii, and One Text-figure.)

[Read 24th November, 1954.]

Synopsis.

The krasnozem soils lying to the west of the 55" rainfall isohyet in the Region, previously described as "anomalous", are not developed on basalt but on a highly sesquioxide clay material interstratified in basalt.

The interstratified material is described and some analytical data for this and associated materials presented. The origin of the material is uncertain but the occurrence of some of the contiguous red and "black" soils of the Region is thereby explained.

The red and "black" soils developing on Tertiary basalt in the Richmond-Tweed region of New South Wales have been described by Hallsworth (1951) and classified at the great soil group level. The pattern of distribution of these soils is such that the red soils or krasnozems cover large areas of the basalt plateau to the east of the 55" rainfall isohyet while the "black" soils, chocolate and prairie, are found on the more sharply dissected plateau remnants to the west. Hallsworth (1951, 1953) and Nicholls (1952) consider that the climatic factor is the chief determinant in the present distribution of the krasnozems, while Teakle (1952, 1953) holds the view that they are relics soils, some of which are derived from laterite.

The presence of small areas of krasnozems lying in lower rainfall areas to the west of the 55" rainfall isohyet in this region, although observed by Hallsworth (1951), has not been explained adequately. Hallsworth regarded these soils as "anomalous" because they did not fit the climatic theory of distribution, and suggested that they were relics of a previous wetter climate.

Recent observations made near Kyogle and Casino indicate that the "anomalous" krasnozem soils are not derived from a normal basaltic parent material but from a relatively easily weathered stratum within the main basalt mass.

The interstratified material, of which three distinct types are recognizable, often forms extensive, roughly horizontal sheets from one to six feet thick, outcropping at much the same level over distances of a half-mile or more. Several bands of this material, separated by unweathered basalt, have been observed outcropping on steep scarps, indicating that the material is not uniquely associated with one flow or period of activity (Fig. 1).

The material may be described as a compacted, unctuous clay which adheres to the tongue on moistening and slakes in water with a faint crackling sound, but does not show expansion properties.* Both red and grey types are found interstratified in the basalt, but the former has the wider distribution. A further type has a strong vesicular structure.

The hardness of the red clay varies from slightly compacted to moderately indurated, the latter variant being less commonly encountered, while colour ranges from bright red to reddish brown. Typical examples are shown in Plate viii, figures 1 and 2, underlying unweathered or partly weathered basalt. The red clay, at its junction with the overlying basalt, generally shows an ashy grey layer from ½" to 3" in depth, which is of fine particle size and often unconsolidated. This layer changes abruptly into the

* The term bentonite has not been used because of this last-named property. Bole, as defined by Holmes (1920), closely resembles some of the material here described.
red compacted clay which is uniform with depth, brittle and crumbly, and which fractures spheroidally. The fracture faces are lustrous and sometimes have a broken black patina. Despite the ease of fracture, the hardened clay can be augered by hand only with extreme difficulty or not at all. Sometimes the clay is slightly vesicular, the vesicles being partly filled with a soft pale yellow, soapy material resembling kaolinite.

The red clay usually passes into a shallow layer of altered basalt, but in some cases a pale grey to black friable layer up to one foot in depth is found between these two zones.

Thompson and Beckmann (1953) have referred to similar red material near Toowoomba as "baked clay".

The grey clay is found less frequently and is generally in a more weathered state. Apart from colour, the morphology closely resembles that of the red clay. Since the grey type is not important in the genesis of the "anomalous" krasnozems, it is not considered further.

The remaining type referred to as vesicular clay appears to be a highly altered type of scoriaceous basalt. In some exposures it is found grading into, and mixed with, the red clay described above.

The red clays were examined mineralogically and chemically. They were found to be free of primary minerals and could be dispersed with strong acid treatment into particles of clay size. No nitrogen and only traces of carbon were found on analysis. The content of Si, Fe, Ti and P for samples taken from the top and bottom of the red layer is shown (Table 1) and compared with analyses of typical krasnozems and basalts. The ferruginous nature of the clay is of note.

The origin of the interstratified material is in doubt. The red material of a similar nature observed by Thompson and Beckmann (loc. cit.) was associated with laterite developed on basalt and buried beneath a later basalt flow. In the Kyogle district there is no evidence of laterite formation on the basalt itself, although massive laterites and companion horizons capped by basalt are found on the underlying Clarence sediments.

As none of the beds shows evidence of sedimentation, it would appear that alteration has taken place in situ. If the process were pedochemical, then the material represents a highly weathered ferruginous, buried soil, consolidated by the overlying basalt flow. Speculatively, the absence of primary minerals would indicate this could not have been a chocolate or prairie soil. The chemical data show the similarity of the red clay and krasnozem soils on elimination of "loss on ignition" (Table 2).

Whatever the origin of this highly sesquioxidic clay material, its importance as a factor in the genesis of some of the "anomalous" krasnozems cannot be overlooked. It explains the occurrence of these red soils at Fairy Hill, Dome Mountain and Rukenvale, where the "black" and red soils are intermingled in a complex pattern. In these situations the parent material of the red soils is mainly the highly weathered,
BY J. W. McGAIRTY AND D. N. MUNNS.

**Table 1.**

**Analytical Data.**

<table>
<thead>
<tr>
<th>Material</th>
<th>Locality</th>
<th>Position</th>
<th>Depth in Inches</th>
<th>Loss on Ignition</th>
<th>St.</th>
<th>Fe.</th>
<th>Ti.</th>
<th>P.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red clay†</td>
<td>Fairy Hill</td>
<td>Top.</td>
<td>0-6</td>
<td>7.9</td>
<td>17-49</td>
<td>24-32</td>
<td>3-06</td>
<td>0-108</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottom.</td>
<td>48</td>
<td>9.9</td>
<td>13-50</td>
<td>20-38</td>
<td>2-46</td>
<td>0-130</td>
</tr>
<tr>
<td>Red clay†</td>
<td>Backmead.</td>
<td>Top.</td>
<td>0-6</td>
<td>9.5</td>
<td>19-78</td>
<td>17-60</td>
<td>2-13</td>
<td>0-123</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottom.</td>
<td>24-36</td>
<td>9.4</td>
<td>20-14</td>
<td>12-92</td>
<td>2-04</td>
<td>0-105</td>
</tr>
<tr>
<td>Red-brown clay†</td>
<td>Backmead.</td>
<td>Middle.</td>
<td>12-24</td>
<td>7.9</td>
<td>21-55</td>
<td>12-63</td>
<td>1-05</td>
<td>nd</td>
</tr>
<tr>
<td>Krasnozem</td>
<td>Nashua.</td>
<td>Top.</td>
<td>3-6</td>
<td>19-0</td>
<td>14-01</td>
<td>13-23</td>
<td>3-48</td>
<td>0-222</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottom.</td>
<td>60-72</td>
<td>11-4</td>
<td>15-74</td>
<td>11-83</td>
<td>2-40</td>
<td>0-272</td>
</tr>
<tr>
<td>Krasnozem</td>
<td>Nashua.</td>
<td>Top.</td>
<td>3-6</td>
<td>18-4</td>
<td>13-30</td>
<td>19-46</td>
<td>3-12</td>
<td>nd</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottom.</td>
<td>60-72</td>
<td>12-3</td>
<td>15-18</td>
<td>12-96</td>
<td>1-98</td>
<td>nd</td>
</tr>
<tr>
<td>Anomalous krasnozem</td>
<td>Woodview.</td>
<td>Top.</td>
<td>3-6</td>
<td>13-8</td>
<td>14-15</td>
<td>14-70</td>
<td>3-18</td>
<td>0-282</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle.</td>
<td>12-24</td>
<td>9.5</td>
<td>15-55</td>
<td>14-70</td>
<td>2-10</td>
<td>0-174</td>
</tr>
<tr>
<td>Basalt†</td>
<td>N.S.W.</td>
<td>Average of 8 samples</td>
<td>21-95</td>
<td>7.70</td>
<td>1.26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Range</td>
<td>-23-35</td>
<td>-8.40</td>
<td>-1.68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basalts† and Dolerites†</td>
<td>N.S.W.</td>
<td>Average of 17 samples</td>
<td>21-40</td>
<td>8.64</td>
<td>1.26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Range</td>
<td>-23-35</td>
<td>-11.90</td>
<td>-2.64</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Analyses by Miss H. V. Rayner.
† Interstratified material.
‡ David's "Geology of the Commonwealth of Australia".

interstratified red clay with varying amounts of addition from surrounding higher basalt. In less obvious cases where the original outcrop has been eroded and removed (as on hilltops), the red soils still contain fragments of the hardened clay in the sand fraction, e.g. Woodview.

The view of Hallsworth, therefore, that these red soils are relic and represent small areas left uncovered by later outpourings of basalt, is not tenable. The patchy distribution of these "anomalous" krasnozems merely reflects the patchy distribution of the outcropping parent material. The varying degree of redness of the soils reflects the variability of this material, and the effects of such factors as erosion and topography. Where the influence of this material is comparatively weak and that of basaltic colluvium strong, as on the sides of steep hills, soils with a reddish chocolate surface and varying degree of subsoil redness may develop. This is particularly noticeable in the dissected area between Kyogle and Nimbin.

Similar occurrences of interstratified material have been observed elsewhere in New South Wales. Near Murrurundi in the Liverpool Range, and at Guyra in the

**Table 2.**

**Comparison of Interstratified Clay and Krasnozem.**

<table>
<thead>
<tr>
<th>Material</th>
<th>Composition as Percentage of Ignited Material.</th>
<th>St.</th>
<th>Fe.</th>
<th>Ti.</th>
<th>P.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstratified clay</td>
<td>Average 5.</td>
<td>20-14</td>
<td>19-13</td>
<td>2-34</td>
<td>0-127</td>
</tr>
<tr>
<td></td>
<td>Range.</td>
<td>14-17-23-25</td>
<td>13-63-25-24</td>
<td>1-13-3-30</td>
<td>0-115-0-143</td>
</tr>
<tr>
<td>Krasnozem</td>
<td>Average 6.</td>
<td>16-50</td>
<td>16-56</td>
<td>3-10</td>
<td>0-270</td>
</tr>
<tr>
<td></td>
<td>Range.</td>
<td>15-75-17-53</td>
<td>13-18-23-04</td>
<td>2-22-4-14</td>
<td>0-191-0-321</td>
</tr>
</tbody>
</table>
New England Tableland, abnormally reddish soils amongst normal chocolate soils are
developed from similar red and vesicular clays apparently lying between basalt flows.
If such occurrences are widespread it may well be that some of the transitional
krasnozem—chocolate, and reddish chocolate—normal chocolate "catenas", hitherto
regarded as the result of topographic effects (Hallsworth et al., 1952), may be effects
of parent material differences.

This study has been assisted by a University of Sydney research grant.

References.


EXPLANATION OF PLATE VIII.

1. Fairy Hill. Chocolate soil and partly weathered basalt (A) overlying red clay.
   (B) in a roadside cutting.

2. Fairy Hill. Close up, showing the ashy incoherent layer (C) at the junction of
   basalt (A) and red clay (B).
SUPPLEMENTARY NOTES ON THE GENUS BRACHYCOME CASS.

DEScriptions OF FIVE New AUSTRALIAN SPECIES AND SOME New LOCALITY RECORDS.

By GwendA L. DAvis, Department of Botany, University of New England, Armidale.

(20 Text-figures.)

[Read 27th October, 1954.]

Synopsis.

Descriptions of the five new species are accompanied by figures designed to illustrate habit, vegetative features and fruits. Affinities and intraspecific variation are discussed in the text.

A number of new locality records are listed which extend the known range of several species for a considerable distance.

INTRODUCTION.

Knowledge of the distribution and natural variation of genera and component species is directly correlated with the activity of collectors, both amateur and professional. Within recent years a large number of specimens of the genus Brachycome Cass. have been received by the writer and, although the majority were referable to well known species, certain of them were quite distinct and are accordingly described as new species.

The range of several species is now known to be more extensive than was previously recorded (Davis, 1948, 1949), and these new records are now listed under the appropriate species. The present location of each specimen cited is indicated as in previous papers (Davis, 1948, 1949) with the following additions:

The Waite Institute, Adelaide (WA1).
C.S. & I.R.O., Canberra (C).
Parks and Gardens Herbarium, Canberra (CP).

TAXONOMY.

COMPOSITAE. TribA AsteroidA.

SUBgenUs EUBRACHYCOME G. L. Davis.

Superspecies Leptocarpa.

BRACHYCOME ULCINOSA, sp. nov.

(Text-figures 1–4.)


Herba perennis, glabra, 9–28 cm. alta; folia radicalia ad 6 cm. longa, 6 mm. lata, ob lanceolata, acuta, aut integra aut interdum 1–4 lobis linearibus, in basi in petiolum gracilem fastigata; pedunculi robustiores, 1–3 linearibus phyllis; capitula 1–3, ligulis circiter 2–5 cm. expansi, involucri phylla circiter 22, 4–5 mm. longa, 1–1.5 mm. lata, subacuta-obtusae, linearia-anguste-ovata, integra; flores radii in speciem violacei, circiter 36, 5–7.5 mm. longi, 1–1.5 mm. lati; receptaculum 5 mm. latum, 2–5 mm. altum, hemisphaericum, non alte punctum; achaenia 1–8 mm. longa, 1–2 mm. lata, fusca, ovata, compressa; corpus leve et glabrum, ala angusta, crassa, integra et pilis margine minutis glandulosisque; pappus albis, simplicibus setis tam longis aut longioribus quam incisura intra alas.

Glabrous perennials 9–28 cm. high. Leaves radical, clustered, up to 6 cm. long, 6 mm. broad, ob lanceolate, acute, entire or occasionally with 1–4 linear lobes; tapering proximally into a slender petiole. Scapo rather robust, with 1–3 linear bracts. Inflorescences 1–3 to each plant, about 2–5 cm. across the expanded rays. Involucral bracts about 22, 4–5 mm. long, 1-1.5 mm. broad, subacute to obtuse, linear to narrow-ovate, entire. Ray florets apparently mauve, about 36, 5–7.5 mm. long, 1–1.5 broad.
Receptacle 5 mm. broad, 2-5 mm. high, hemispherical, shallowly pitted. Fruits 1-8 mm. long, 1-2 mm. broad, dark golden-brown, oval, flat; the body oblong, smooth and glabrous, sharply demarcated from the narrow, thick, entire wing which bears minute white glandular hairs along the margin. Pappus of white simple bristles equal to or slightly exceeding the notch between the wings.

Habitat: Swampy situations.

Range: Southern and western districts of Victoria.

Distribution: Eltham, 21.8.1903, P. R. H. St. John (MEL); Brisbane Ranges, 17 miles S.W. of Bacchus Marsh, 30.10.1943, J. H. Willis (MEL); Moyston, 10.1881, D. Sullivan (MEL); Mt. William Creek, 10.1879, D. Sullivan (MEL); Eastern foot of Black Range, near "The Pass", heathland swamp, 2.11.1948, J. H. Willis (MEL); Folley, 27.8.1905, F. M. Reader (MEL); Little Desert, 8 miles south of Lawloit and 2 miles east of Cattabrin Springs, swampy tracks, 11.9.1949, J. H. Willis (MEL); Wimmera, 1893, W. E. Matthews (MEL).

This species appears to be widely distributed in western Victoria, but due to the close vegetative resemblance to B. scapigera (Sleb. ex Spring) D.C. may well have been recorded as that species from other districts and even other States. Both species bear similar leaves and the base of the plant in each instance is surrounded by the fibrous remains of previous season's leaves. The only vegetative feature which distinguishes B. aliginosa from B. scapigera is the tendency in the former species for occasional leaves to bear a few linear lobes.

The fruits of B. aliginosa show certain similarities to both B. radicans Steetz ex Lehmann and B. dissectifolia G. L. Davis, and specimens from Moyston and Mt. William Creek were previously recorded as new records for the latter species (Davis, 1949). The relationship, however, is closest to B. radicans, from which the fruits can be distinguished by their oval body, and non-inflated thick wing.

B. radicans is widely distributed in swampy situations in eastern Australia and it is possible that both B. aliginosa of Victoria and B. dissectifolia of New England originated as geographic subspecies of B. radicans.

Brachycome rara, sp. nov.

(Text-figures 5-8.)

Holotype: Floodwaters of the Wilson River, western Queensland. 9.1922, W. MacGillivray. (WAI. 8118.) Paratypes: Two Loc. cit. (WAI. 8140.)

Herba in speciem annua, circiter 10 cm. alta aut altior, a basi ramosissima et mic. glandulosas; folia caulina ad 4 cm. longa, 1 cm. lata, lanceolata, sessilia, integra, acuta; pedunculi axillares et terminales, graciles, aut nudi aut uno parvo filio; capitula circiter 35, ligulis diametro 1-3 cm. expansis; involuci phylla 22, 3-5 cm. longa, 1-1-1-5 mm. lata, oblonga, laciniata, integra, glandulose et fibrinato-ciliata; flores radii circiter 24, 4 mm. longi, 1-2 mm. lati, probabiliter caerulei; receptaculum 2 mm. latum, 1-5 mm. altum, hemisphaericum; achenea 1-1-2 mm. longa, 0-6-0-8 mm. lata, cuneata, compressa, rubida; latus utrumque gibbus fuscum longum, utrimque longo sinu, habet; margines crassae et teretes sunt; pappus mic. ora est.

An apparently annual plant about 10 cm. high or higher, much branched from the base and microscopically glandular all over. Cauline leaves up to 4 cm. long, 1 cm. broad, lanceolate, sessile, entire, acute. Peduncles axillary and terminal, slender, naked or with a single small leaf. Inflorescences about 35, 1-3 cm. diameter across the expanded rays. Involucral bracts 22, 3-5 cm. long, 1-1-1-5 mm. broad, obovata, subacuta, oblonga, laciniata, integra, glandulosa et ciliata. Ray florets about 24, 4 mm. long, 1-2 mm. broad, probably blue. Receptacle 2 mm. broad, 1-5 mm. high, hemispherical. Fruits 1-1-2 mm. long, 0-6-0-8 mm. broad, cuneate, flattened, reddish-brown, with a raised dark-brown protuberance running vertically on each face, bordered on either side by a longitudinal fold; margins thick and rounded. Pappus represented by a microscopic rim.

Range: Only known from the type locality.

Specimens examined: Type series only.
BY GWENDA L. DAVIS.

Acknowledgements.

In particular, I would like to acknowledge the assistance of Mr. J. H. Willis, of the University of New South Wales, for writing the Latin diagnoses of the new species.

I am also indebted to Miss Greta Baddams, formerly of the University of New England, for helping to correct Latin diagnoses of the new species.

No. 10168); Fagan's Reserve, 3 miles north of Walbundrie, white rays, plentiful on wet habitat among herbage. Until now, the colour of the ray florets has not been known.


Brachycome exilis Sond., Linnaea, xxv (1852): 449.


Western Australia: Halfway between Mt. Ragged and Victoria Springs, 1886, Shipibo (MEL).

Central Australia: Mt. Ultim, 1.9.1930, J. B. Cleland (JBC); Mt. Allen, Summit, 1.9.1930, J. B. Cleland (JBC).

South Australia: Greenby Island, North Island, 20 miles from Eyre Peninsula, 30.7.1866, J. B. Cleland (JBC). Previous record: Macleay River, New South Wales, 2.9.1941, K. Ingram (KI).

New South Wales: Smoky Cape, Macleay River, 2.9.1941, K. Ingram (KI); South Rocks, 12.1946, K. Ingram (KI).

New South Wales: Between Grafton and Glen Innes, 25.4.1912, J. B. Cleland (JBC); Smoky Cape, 2.9.1941, K. Ingram (KI).

These records link up the two original localities cited, Wagga and Nathalia, and the species collected by them.

These specimens extend the range of this species into southern New South Wales, where it appears to be relatively common in grassland.

Previously not recorded north of the Manning River.

This is the first and only record of this species from Western Australia.

14-17, B. vipersis.—14, Habit x 4; 15, 16, Variation in Fruits x 12; 17, Distribution.

18-20, B. Egrensis.—18, Habit x 4; 19, Fruit x 12; 20, Distribution.
The fruits of this species are unique in their possession of a dark projecting longitudinal ridge on the centre of each face. No similar structure has been seen in any other species, but the pad-like confluent tubercles on the fruits of *B. Whitei* G. L. Davis suggest its origin from a structure of this nature. The thick margin-like wing can only be seen to advantage in the mature fruits, following the development of the longitudinal folds which demarcate the body.

Since this species has never been collected before, it is possible that it makes its appearance only after heavy rain when the country is under flooded conditions and collectors are unlikely to be in the area.

**Brachycome gracilis**, sp. nov.

(Text-figures 9–13.)


*Herba annua, gracilis, pilis paucis-multis, ad 9 cm. alta, a basi ramosa; folia caulina 1-1.8 cm. longa, pinnatifartita, in basi fastigata; partes 5, lineares, 2 mm. longae, 1 mm. latae, acutae; pedunculi filiformes, terminalae; capitula ligulis diametro 2 cm. expansis, maturitate diametro 5–6 cm. hemisphaericis; involucris phylla 9–13, 2:5–3 mm. longa, 1.5 mm. lata, rhombata, acuta, mic. fimbriato-ciliata et glandulosa; flores radii 8–12, ligulis albis, 4 mm. longis, 1.5 mm. latis; receptaculum 1 mm. latum, 1 mm. altum, acutum conicum, aetius punctum; achaeonia 1.5–1.7 mm. longa, 1 mm. lata, nigra, cuneata, in ulterius partia valde curvata; corposc bo crassis, rigidissim marginibus, quae modo sinuatum supra pappi basim pro-curritum, inciscare secto; pappus albus, conspicuus, non stellatus, setis simplicibus.

Slenferlyr sparsely sepalate-hairy annuals, up to 9 cm. high, branching from the base. *Leaves* cauline, 1–1.8 cm. long, pinnatifartite, tapering proximally; segments five, linear, 2 mm. long, 1 mm. broad, acute. *Peduncles* filiform, terminal. *Inflorescences* 1 cm. diameter across the expanded rays. *Infructescences* 5–6 mm. diameter, hemispherical. *Involucral bracts* 9–13, 2:5–3 mm. long, 1.5 mm. broad, rhomboidal, acute, micropscopically torn-ciliate and glandular. *Ray florets* 8–12, the rays white, 4 mm. long, 1.5 mm. broad. *Receptacle* 1 mm. broad, 1 mm. high, steeply conical, rather deeply pitted. *Fruits* 1.5–1.7 mm. long, 1 mm. broad, black, cuneate, strongly curved distally; central body inconspicuously demarcated from the thick rigid margins which extend upwards as curved folds above the point of insertion of the pappus. Pappus white, conspicuous, not stellate, the bristles simple.

*Range*: Only known from the type locality.

*Specimens examined*: Type series only.

All specimens examined have the same slender appearance and are probably ephemeral, the whole life cycle being completed during spring. Although this species has only been collected from the type locality, it is possible that its actual distribution is more extensive and that previously flowering plants have been referred to *B. goniocarpa* Sond. et F. Muell., with which there is a close resemblance vegetatively and in the young fruits. The mature fruits, however, are strongly curved through the development of a thick wing and an affinity with *B. campylocarpa* J. M. Black is indicated.

**Brachycome riparia**, sp. nov.

(Text-figures 14–17.)


*Herba perennis, ramosissima, aut erecta aut ascendens, ad 36 cm. alta, indumento mic. glandulosos; folia multa, caulina, cuneata, inferioria ad 35 cm. longa, 7 dentibus acutis et petiolo gracill, superioria minora et postremo sessilia; pedunculi plerumque gracles, 1–2 folis filiformibus; capitula plurima, ligulis diametro ad 1:5 cm. expansis; involucris phylla 18–22, 4 mm. longa, 0–6–0.8 mm. lata, linearis, acuminata, mic. fimbriato-

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