The Glaucous *Hebe* of the Inland Patea.

Veronica colensoi, V. hillii, and V. darwiniana.

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PRELIMINARY.

THE position of the glaucus North Island Hebes variously referred to, under these species, was outlined by Cockayne and Allan in 1926 ("The Present Status of the N.Z. Species of *Hebe*," *Trans. N.Z. Inst.*, vol. 57, pp. 26–28). They pointed out the unsatisfactory state of our knowledge concerning all the forms, and considered that these should be studied afresh.

An investigation of the area in which the group occurs was begun in 1930 and has been continued to the present. Though it is apparent from the accompanying map that the area involved (roughly a 50 km. square) has only been partially covered, it should be noted that a large part of the central area consists of the tussock plateau of the Inland Patea, which does not afford a suitable habitat. Attention has been concentrated on the river valleys to east and west and the Kaimanawa, Kaweka and Ruahine ranges which bound the area to north and south, and these have been as thoroughly searched as time and the type of country have permitted.

The available evidence points to the existence of three distinguishable jordanons of one species, obscured by considerable epharmonic variation and (in part of the area) by hybridism between jordanons. The type specimens and published descriptions of the different forms given specific rank (*Veronica colensoi, V. hillii* and *V. darwiniana*) cannot unfortunately be correlated with any of these jordanons, and must be referred rather to epharmonic variation or hybridism with other species of *Hebe*.

OCCURRENCE AND HABITAT.

The glaucous-leaved *Hebe* referred to *V. colensoi* in Cheeseman's *Manual* (1925) occurs in isolated colonies of limited extent, mostly on the cliffs of the river valleys surrounding the plateau of the Inland Patea, the Mangamaire, Rangitikei, Taruarau and Ngarururo. An outlying colony occurs in the Makahu to the east of the Kaweka Range, and Colenso in his account of the crossing of the Ruahine Range mentions one specimen on a ridge above the Maropea Stream, but the exact location is not known at the present day. It is usually found in an association of a much wider distribution with *Angelica rosaefolia* and a rupestral *Hebe* resembling a much-stunted *H. angustifolia*, but it is found, much depauperated, in manuka on road cuttings

west of the Taruarau and at four thousand feet in the Southern Kaweka in a sub-alpine association, on the divide between the Ngarurоro and Tutaekuri Rivers.

It is subject to very heavy infestation by a white scale in the Rangitikei-Erewhon area (also observed in the Makahu at the eastern extremity of its range) and in cultivation is very susceptible to attacks of the fungus of *Peronospora* sp. under damp conditions. The root system is not developed near the surface, as, for example, that of *H. laevis,* and it stands drought well.

Identification.

The species in general is easily identified from its open habit, leaves bunched at the tips and glaucous on both surfaces (not green above as stated in the *Manual*) and racemes forming a close head when in flower (fig. 3). The leaf shape also is most commonly oblong-obovate or elliptic, certain changes taking place with age, so that the leaves tend to become broader and less glaucous from the tip of a twig downwards (fig. 2).

The main drawbacks to successful identification have been the wide range of forms, particularly in leaf shape, amount of marginal incision, the occurrence of branching of racemes, and to a certain extent the degree of glaucescence, though this does not appear a difficulty in the field.

Epharmony.

The group has been studied by a combination of field observations with cultivation, from which it appears that considerable epharmonic variation is present, which accounts for the presence or absence of branched racemes, the small-leaved and most of the narrow-leaved forms. The branching of the bottom pair or two pairs of racemes is general in cultivation. (In only one case, where from other considerations hybridism was suspected, have simple racemes persisted in cultivation.) In well-grown plants half to two-thirds of all flowering stems show branching. The upper racemes persistently remain single, and not infrequently a terminal spike is developed forming a panicle (fig. 3). This has also been observed in the field in two instances.

The leaves in cultivation increase in size (approximately 10% in dimensions) but preserve their characteristic shape except forms with linear-oblong, slightly-incised leaves, which prove to be epharmones of a jordanon with elliptic much-incised leaves which is described below.

The first leaves are green and toothed, the toothing persisting into the second year of growth as incisions in glaucous leaves, though the adult plant may bear entire leaves, and in rare cases where these incisions persist the cause seems more likely to be epharmonic than due to hybridisation with a jordanon bearing incisions.

Jordanons.

Eliminating these variations, three jordanons can be identified on leaf shape and the presence of marginal incisions (fig. 1). The basis is partly geographical as indicated by the following table:—

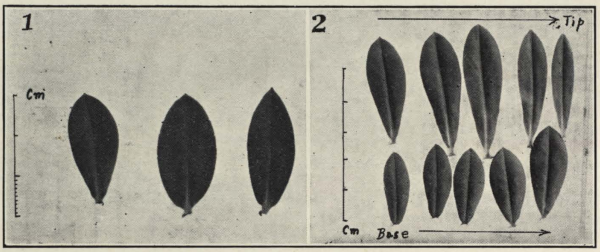

FIG. 1.—*Hebe colensoi*. Leaf forms of Jordanons. 1—Taruarau. 2—Kuripaponga. 3—Rangitikei.

FIG. 2.—Changes in Leaf Form from base to tip of Shoot. Jordanon 1 (Cultigen).

FIG. 3.—Jordanon 1 showing racemes and terminal panicle.

FIG. 4.—Jordanon 2. Jordanon 3. In cultivation, showing typical drooping habit of the latter.

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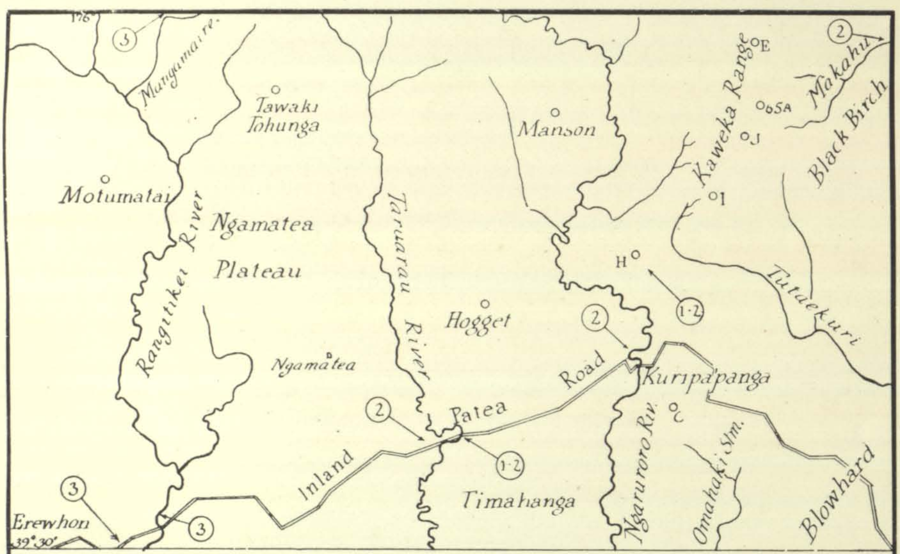

Distribution of Glaucous Hebes

Numbers indicate jordanons preponderantly represented (2)→

Scale

0 1 2 3 4 5 6 7 8 9 10 MILES.

Fig. 5

Distribution of Glaucous Hebes (percentages).

		Margin Entire.		Margin Incised.	
		Leaf obovate. Jordanon 1.	Leaf elliptic.	1-10 pr. general. Jordanon 2.	0-3 pr. occasional.
Eastern.	Kuripapanga ..	0	0	78	22
	Makahu	0	14	50 + 17	19
	S. Kaweka ..	35	9	35	21
	Taruarau ..	51	15	13	21
	Eastern total ..	31	12	37	21
Western.			Jordanon 3.		
	Rangitikei and Mangamaire	3	93		4
	Western total ..	3	93		4

These figures can only be taken as rough approximations for the colonies of the eastern area, though the totals for the eastern and western areas represent large and comparable numbers.

The first column represents a jordanon with obovate entire leaves most strongly represented at the Taruarau bridge, and probably occurring all through the eastern area. It comes true from seed and agrees with the Kew specimen of *V. hillii* Col. It does not appear to be present in the western area, the figure in that column covering variations in leaf form in specimens otherwise recognisable as a western jordanon.

Column 2 covers a well-marked jordanon, of the Western area, distinguished by the larger size of fully-developed plants and drooping branch tips (fig. 4). The leaf has a characteristic shape—Cheeseman's " oblong-lanceolate " perhaps describes it better than " elliptic." It does not occur in the eastern area; the figures in that column certainly refer to hybrids between another Eastern jordanon and that of column 1.

Column 3 represents the jordanon, preponderant at Kuripapanga and the Makahu and present throughout the Eastern area. It is distinguished by much-incised elliptical leaves. Its seedlings are noticeably slower than those of the other jordanons to assume the glaucous colour of the adult form and epharmonic variation is more marked, the extreme form having a linear-oblong leaf, only slightly incised.

The lesser figure against the Makahu colony represents a group with strongly serrated rather than incised leaves, whose affinities are not obvious. The colony is a comparatively small one, outside the main area of distribution, and having only recently been located, breeding experiments have not yet had time to give any results.

The fourth column does not lend itself to ready analysis, but consists partly of exposed epharmones of the third jordanon, and almost certainly a number of cases of occasional juvenile toothing persisting in adult forms of both the first and second jordanons.

A large proportion of the fourth column together with column 2, however, must be referred in the eastern area to the existence of hybrids between jordanons one and three. Except in the Makahu a fair range of forms in leaf shape and the development of incisions occur in each colony, and, though jordanon one has not been collected at Kuripapanga, forms closely approaching it have been.

Hybridization with other species is suspected in one example at the Taruarau, but cultivation from seed has given no definite proof of this.

In the Dominion Museum Petrie's No. 6 from the Upper Rangitikei ford, " identified at Kew in 1891 as *V. colensoi,*" appears to be a hybrid, its blackness in drying suggesting *Hebe buxifolia* as a possible parent.

Historical.

In dealing with the taxonomic history of the species I am greatly indebted to Dr. H. H. Allan, who has given me very full information, particularly of the type specimens of *V. colensoi, V. hillii,* and *V. darwiniana,* examined by him at Kew.

V. colensoi Hook. f., in *Handbook N.Z. Flora,* 1864, p. 209.

Colenso sent to Hooker f. specimens (4062 and 4265) " from a high stony ridge above the River Taruarau between Hawke's Bay and Taupo. *V. glauca* W.C.," and this material was used by Hooker (together with South Island material, since separated by Cheeseman) in founding *V. colensoi.*

These specimens are at Kew, and from a tracing of the leaf outline this appears to be an exposed epharmone of jordanon one which is well represented at Taruarau bridge.

V. hillii Col., in *Trans. N.Z. Inst.,* vol 28 (1896), p. 606.

This was founded on specimens collected by Hill at Kuripapanga in 1894. He notes " in drying, the leaves lose much of their dark-green colour above and become glaucescent," and Cheeseman apparently uses this information in his description of *V. colensoi* (*Manual,* 2), citing *V. hillii* as a synonym. Apart from leaf colour (all forms are definitely glaucous on both surfaces) the Kew type is a luxuriant form of jordanon one.

V. darwiniana Col., in *Trans. N.Z. Inst.,* vol. 25 (1893), p. 332.

This was collected by Colenso " in hills in the interior, Hawke's Bay." He describes the leaves as " glaucous-green, eight to nine lines long by two and a half to three lines broad," and, in comparing it with *V. colensoi* Hook., adds " leaves smaller, sub-concave and of another form."

The leaf-outline of the Kew specimen, apparently the only one in existence, suggests the exposed epharmone of jordanon two, in which case some trace of incised margins would be expected.

[The description in the *Manual* (2) appears to refer to the South Island *V. glaucophylla,* included there with it, but fairly certainly specifically distinct.]

DESCRIPTION.

Jordanon One.

As in the *Manual,* but leaves ± 2·4 cm. long by ± 1 cm. wide (considerably reduced in exposed situations), oblong-obovate, subacute, slightly keeled, glaucous on both surfaces. Lowest pair or two pairs of racemes (except in exposed situations) tripartitely branched, upper simple.

Locality: Isolated colonies Taruarau and Ngaruroro Rivers on rock faces, 1800 ft. to 3000 ft. Fell-field, S. Kaweka, 4500 ft. Flowering October to January.

Jordanon Two.

As for One, but leaves ± 3 cm. long by ± 1·1 wide, elliptic, with 3–10 pr. marginal incisions (in exposed situations, leaves linear-oblong ± 1·9 by ± 0·6 cm., 0–2 pr. marginal incisions).

Locality: With One, and crossing with it. Also on Makahu Stream (Puketitiri).

Jordanon Three.

As for One, but a larger plant ± 70 cm., branches spreading or prostrate, frequently drooping at tips. Leaves ± 2·5 cm. by ± 0·9 cm., elliptic-lanceolate, entire.

Locality: Isolated colonies in Rangitikei watershed; on rock faces Mangamaire River; Rangitikei River at ford above present bridge and on road to the west at Blackhill. 2000 to 3000 ft.

SUMMARY.

(1) The glaucous-leaved Hebes discussed belong to one species, for which the earliest name, *Hebe colensoi* (Hook. f.) Ckn., is adopted.

(2) Three jordanons are described and their relations with *V. colensoi, V. hillii* and *V. darwiniana* are examined. These names, however, are based on such imperfect material and the jordanons are so close that varietal names are not proposed.