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*CALLUNA VULGARIS* - POUAKAI RANGE, EGMONT NATIONAL PARK

(Short Answers in Conservation Science)

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## **Calluna vulgaris - Pouakai Range, Egmont National Park**

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### **INTRODUCTION**

According to Scanlan (1961), James Henry an Edinburgh nurseman, seeded heather (*Calluna vulgaris*) on the summit of the Pouakai Range in the late 1860s. The species evidently established, because Henry demonstrated to mountain visitors how well the heather was "blooming" in February 1872. Whether the word "blooming" can be interpreted as vegetative or flowering vigour is problematic, although peak flowering of populations in Tongariro National Park occurs in February. Along with heather, Henry also seeded blue currant ..... "for the purpose of gathering the honey, and we hope that no one will touch them. Seventy years later a New Plymouth botanist, offended by the incongruity of the Scottish heather, slashed at it angrily on top of the ranges and regretted he lacked a spade to destroy it" (Scanlan (1961).

We can be confident that the heather survived through to 1961, because Scanlan noted ..... "And his (James Henry) Scottish heather bravely endures to this day". Barry Hartley, current chairperson of the Taranaki Wanganui Conservation Board, remembers prostrate flowering heather "beside the tarns" on a ridge toward Maude and Henry Peaks between 1949 and 1953 (C.C. Ogle pers. comm. 1994). Tony Druce then recorded it in his botanical surveys of the Park in the early 1960s (Druce 1973), and likewise Bruce Clarkson (Clarkson 1986) in his botanical survey of the Park between 1975-78 (Clarkson 1981). Tony Druce (1973) reported removing the species wherever he encountered it, and Bruce Clarkson also weeded the species on at least two occasions (B.D. Clarkson pers. comm. 1994). Bruce Clarkson remembers the species as almost prostrate, ramifying through the low herbs of the prominent clearing on the *south side* of the Pouakai Track at its junction with the Mangorei Track (NZMS 260 P20 997183). This prostrate habit precluded thorough weeding of individual plants in the tightly compact bases of herbs and tussocks.

### **PRESENT INVESTIGATION**

This year a park visitor notified a Department of Conservation staffer, Jim Clarkson, of the species' presence adjacent to a track on the summit of the Pouakai Range. In response, Jim Clarkson and Kerry Matthews (also of DoC) relocated the species adjacent to the Pouakai Track, but this time on the north side some 25 m west of the track junction.

NB: There was an attempt on 29 November 1994 by John Barkla, Bruce Clarkson, and Brian Molloy to eliminate by handweeding the apparently one remaining plant of heather on the Pouakai Range (B. Clarkson, pers. comm. 1994).

### **HABITAT CONDITIONS**

Using directions and a grid reference provided by Jim Clarkson I recently located the same plant(s) as recorded by Clarkson and Matthews adjacent to the Pouakai track. Decumbent heather occurred over a 4.5 x 1 m area, ramifying through prostrate herbs and scattered tussock bases of a herbfield within shrubland. Important plants of the small herbfield were *Celmisia*

*gracilentia* var., *Ourisia macrophylla* subsp. *macrophylla*, *Poa colensoi*, *Gaultheria* sp. unnamed (*G. depressa* var. *novae-zelandiae*), *Coprosma depressa*, and *Luzula* sp. The higher canopy and shaded understorey of subalpine shrubs surrounding the herbfield seemed to contain the plant therein. Subalpine shrubland of the Pouakai Range in the vicinity of the heather is dominated by *Brachyglottis rotundifolia* var., *Coprosma pseudocuneata*, *Dracophyllum longifolium*, *Hebe odora*, *Pseudopanax colensoi*, *Gahnia procera*, and *Astelia* sp. unnamed (aff. *A. nervosa*). The altitude of the site is approximately 1250 m, within the 850-1600 m altitudinal range of heather at Tongariro National Park (Chapman & Bannister 1990).

I failed to uncover additional plants of heather during a thorough search of the mosaic of herbfield and tussock grassland within shrubland around the summit saddle. The search extended 80 m either side of the summit track and 150 m either side of the junction between the Pouakai and Maude tracks.

Several behavioural traits suggest a poorly performing species compared to the behaviour of heather in Tongariro National Park:

- an absence of seedlings despite apparently ideal establishment conditions in surrounding herbfield;
- an excessively decumbent habit;
- attenuated stems of small diameter and flaccid habit;
- a low foliar biomass to total biomass ratio;
- large amounts of decomposing stems and foliage.
- an absence of empty seed capsules pointing to no seed set or perhaps even flowering last summer.

## **COMPARISON WITH TONGARIRO NATIONAL PARK**

Physical factors apparently limiting the vigour and spread of heather in this environment are:

- a perhumid atmosphere;
- humic, moderately gleyed, and excessively leached soils;
- a low level of irradiance;
- mechanical buffeting from persistently strong winds.

Equally high humidity, persistent cloud, and windiness of the Pouakai Range all appear to substantially exceed their comparable levels at Tongariro National Park. In addition, the invasive and population growth potential of heather onto poorly-drained and leached sites of Tongariro National Park is substantially less than that demonstrated on zonal well-drained sites characteristic of the seral tussock grasslands (Rogers 1993). Site stability on the rounded Pouakai ridges produce deeply weathered, leached, and moderately gleyed soils equate closely to soil conditions on poorly-drained sites of Tongariro National Park. Extensive subalpine scrub dominated by *Brachyglottis rotundifolia* var. restricts the available habitat for heather on the Pouakai Range to open herbfield and tussocks on the most poorly-drained sites. Dense ground

cover and root competition within the herbfields probably also inhibit heather recruitment whereas bare ground of consistently <10% is a feature of seral tussock grassland and shrublands of Tongariro National Park. Furthermore, discs cut from the largest diameter stems of heather on the Pouakai Range were 21 years of age suggesting a conservative life expectancy for the plant compared with 30 years for Tongariro plants (G. Rogers unpubl. data).

Another factor possibly contributing to its uncharacteristically poor performance on the Pouakai Range compared to central North Island is a difference in genetic stock. Bagnall (1982) reports some of the Tongariro National Park heather was sourced from seed from France and the British Isles, including Scotland, but the Scottish material "contained little viable seed". James Henry on the other hand, being an expatriate Scot probably obtained seed from Scotland and his seed could have similarly suffered from poor viability.

## **CONTROL**

Hand weeding and herbicides are the two techniques that have been trialled for controlling heather (Rogers 1993). The pros and cons of each technique are as follows:

1. *Hand weeding* - we can be reasonably confident that sporadic weeding during the last 125 years has progressively reduced the local abundance and range of the species. The logistics of handweeding are little different from spraying with herbicides given the remote location and wet and windy environment. We cannot be confident that handweeding will immediately eradicate individual plants because ground-hugging and subterranean tissue is virtually impossible to completely uncover and remove at one attempt. However, coupled with on-going monitoring, handweeding seems an effective method of progressively eliminating individual plants and eradicating the species from the park. The species' apparent inability to consistently set seed substantially reduces the population growth risk of this strategy.
2. *Herbicides* - the results of herbicide trials against heather in tussock grasslands of the Rangipo depression (Rogers 1993) point to Tordon Brushkiller and Roundup as effective herbicides for control. Both chemicals are broad spectrum for woody species and would require at least 2 applications 2-3 years apart to eliminate the present standing biomass and to control resprout. Grasses and herbs remain unaffected by both herbicides, but loss of some native woody species would be an inevitable consequence of their use in the mixed communities with heather on the Pouakai Range.

## **RECOMMENDATION**

The scale of the infestation, the apparent historical success of handweeding, the local unthrifty performance of the plant, and lack of seed set all suggest that handweeding, with follow-up monitoring, will be an effective and efficient means of eradication of heather from the summit of the Pouakai Range.

## **CONCLUSIONS**

This investigation suggests the following:

- James Henry broadcast seed across the summit herbfield and tussock grassland immediately above the present Pouakai Hut and that disparate groups of plants established;
- The species survives to the present day, but at a low level partly due to a succession of

mid to late 20th century weeding attempts on individual patches;

- The species is rare on the Pouakai Range and probably restricted to the remains, after weeding, of just one patch;
- Climatic, edaphic, and community competition factors have acted in concert to contain the population to the summit clearings. In contrast to the apparently ideal conditions of Tongariro National Park and environs, the soils are consistently too wet, insolation is insufficient, and the perhumid, windy atmosphere all act to suppress species' performance. Shaded understoreys of shrublands inhibit population growth and spread and the species is accordingly restricted to herbfields with scattered tussocks on poorly-drained soils;
- Reproductive performance is conservative and is mostly vegetative (both basal resprout and layering). Seed set is probably inconsistent, but germination can occur as the species originally established from seed;
- Hand weeding with follow-up removal of basal resprout and new seedlings is an effective and efficient method of containment, and eradication is achievable with consistent monitoring.

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