	AK	U	MR	MA	w	МК	0	Р
Thelymitra pauciflora agg.		PY						
Tradescantia fluminensis *		Р						
Triglochin striata		BPY	В		В			
Typha orientalis		BP	BP		В		BY	
Vulpia bromoides	+	BP	BP		В		В	
Washingtonia filifera *				pIP				
Watsonia bulbillifera *	+	Ρ	Р			В		
Xeronema callistemon		pIP				pILP		
Yucca elephantipes *				pIP				
Yucca gloriosa *		pIP						pIPY
( <i>Yucca</i> sp. *)						(plG)		
Zantedeschia aethiopica *		PpIP	PY					
Zostera muelleri	+	BPY	Р	Ρ				

# The nectaries of *Xeronema* and *Phormium*

#### **Rhys Gardner**

### Introduction

Lucy Moore's description of the Poor Knights lily, *Xeronema callistemon*, in the second volume of Flora of New Zealand (Moore & Edgar 1970), favours this lovely plant with some "extra-taxonomic" touches. In particular, she mentions how its red, upright flowers accumulate nectar in the three concavities at the top of their 3-locular ovary. I illustrate this in a photograph (Fig. 1). A fuller picture of ovary structure, including the location of the seeds and the splitting of the ripened capsule down the prominent midline of each locule, is to be found in Moore & Irwin (1978); my Fig. 2 shows this later stage.

### The nectaries

It can be assumed that the nectar of *Xeronema* is formed by glandular tissue of the ovary's three septae (radial walls), and opens to each exterior concavity by a pore or slit. Such "septal nectaries" are mentioned by Moore & Edgar (1970: 27, 46) for two related genera: *Astelia* has "nectaries 3, slit-like, below and between [i.e. alternate with] the stigmatic surfaces", and *Cordyline* has "nectaries slit-like, one over upper part of each septum".

In the 1970s, *Xeronema*, *Astelia* and *Phormium* were placed in the Liliaceae, with *Cordyline* not far distant in the Agavaceae. Today these genera are grouped together in the day-lily family, Hemerocallidaceae (with some slight reservation about *Xeronema*). This family is located within the order Asparagales, whose members have septal nectaries (Kubitzi 1998: 245). These structures are

not found in the Liliales; nectaries here are associated with the bases of the tepals or stamens.

What then of *Phormium*, the New Zealand flax? It produces more nectar than any other native plant, but our Floras are silent on its origin, and even the sharp-eyed Moore and Irwin (1978: 180) just say that "When the flower opens drops of sweet nectar accumulate at the base of the long ovary and attract birds ...". *Phormium* does have septal nectaries though (Fig 3; Gardner 2007). Note that the Moore and Edgar (1970) description of its ovary as superior in position is only half correct; the lower part of the ovary, where the nectarproducing septal tissue has "proliferated", lies below the fused bases of the tepals and stamens. (Try squeezing a flower at this level, to make nectar emerge from the septal pores).

### Epilogue

I had thought my *Phormium* work was new, but a Google search deflates: the plant's septal nectaries have been known to German botany for more than a century (Schniewind-Thies 1897; not seen, cited by Weberling 1992: 200).

The authors of the Hemerocallidaceae account in the prestigious "Kubitzi" volume, which came out in 1998, also overlooked the old German work and the 1992 mention of it. They even say in their description of the family that septal nectaries do not occur in *Phormium*, but make no suggestion as to where its nectar might come from.



**Fig. 1.** *Xeronema callistemon.* Flower, oblique view down on to top of ovary, showing three large drops of nectar overlying the ovary's three septae. **sb** style base, **n** nectar drop, **ml** mid-line of front locule. Style base is c. 1 mm diam. Photo: ROG, 1 October 2013.



Fig. 2. *Xeronema callistemon*. Ripe fruit-capsule, oblique view as in Fig. 1, showing the capsule opening down the mid-line of each locule. One seed **s** in the split **ml** of the front locule. Style base c. 1 mm diam. Photo: ROG, August 2015.



**Fig. 3.** *Phormium tenax.* Flowers whole and dissected. Whole flower (A) scale bar 1 cm; dissected flowers (B & C) scale bar 5 mm. **A.** Whole flower at anthesis, the dashed line indicating the expanded bases of the sepals, several mm above the base of the nectar-accumulating floral tube. **B.** Flower (front part of floral tube removed), the base of the ovary cut obliquely to show ovules in the fertile, superior part of ovary (white arrow), and the ruminate nectar-producing chamber in the sterile, inferior part (black arrow). Dashed line as in A. **C.** Flower (free parts of entire floral tube removed), the pore of a septal nectary (arrow) showing at the base of ovary's superior part, and overlying the septum between two locules. Photos: ROG, 2007. Reprinted from *NZ Natural Sciences* 32: 30, fig. 1, 2007, with permission.

There is a third "grim warning" (painful to record; readers will be aware how much I value *The Oxford Book of New Zealand Plants* as a source of morphological inspiration). I have already said that flax's nectaries escaped notice there. For *Xeronema*, the coloured sketches are, as usual, exquisite, but they do not show the nectar drops. Worse, a caption (Moore & Irwin 1978: 180 "2d") notes "prominent nectaries around base of style", and looking at the

sketch it is natural to think that reference is being made to the ovary's three, darkened, shoulder-like protuberances. But these are alternate with the nectar-concavities; their slit is not a nectar-channel but the future line of splitting down the middle of each locule. The similar orientation of the flower in Figs. 1 and 2 of the present article should make this clear; if not, study the Moore and Irwin page, and check out the flowers yourself early this summer.

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# A tale of two types

#### **Graeme Jane**

While working on the *Coprosma parviflora* group I had a taxon *C. ciliata* "eastern SI" (Jane 2007). At the time, I needed to identify *C. parviflora* var. *dumosa* and perhaps exclude it as a possible name. After examining the type (AK 8868) and associated specimens at Auckland Museum herbarium, I felt I needed to locate and visit the type locality for *C. parviflora* var. *dumosa*.

The identification of *Coprosma parviflor*a var. *dumosa* has been quite confused (Jane 2003). In the course of three publications dating from 1886 to

1906 Cheeseman mentioned three different varieties. He formally described only two (var. *pilosa* and var. *dumosa*) in his *Man. N.Z. Fl.* (Cheeseman 1906: p.254). After his visit to the Auckland Islands Cheeseman (1909: p.410) acknowledged that his var. *pilosa* was in fact probably *C. ciliata.* In part this was due to confusion at the time between *C. ciliata, C. myrtilifolia* and *C. parviflora.* 

Much later, *Coprosma parviflora* var. *dumosa* was assigned a type (Allan 1961) based on collections made by Cheeseman from the Red Hills at 2500



Fig. 1. *Myosotis laeta* plant. Jan 2015. Near Red Hills Hut, 780m altitude. All photos by author.



Fig. 2. Myosotis laeta flowers. Jan 2015.