Searching the internet for current New Zealand sources of alexanders seed, I discovered a herbal products company called 'The Herb Farm', based in Manawatu, that featured this species as its "Plant of the Week" in August 2006 (The Herb Farm 2006). The article noted that alexanders had "established itself beautifully under trees in our woodland areas".

The distribution of alexanders, which includes much colder climates such as Britain, indicates that alexanders may be naturalised more widely in southern New Zealand, or at least have the potential to do so with further distribution and cultivation as a culinary herb.

Acknowledgements

Thanks to the herbarium staff of Auckland Museum (AK), Landcare Research (CHR) and Te Papa (WELT) for checking their holdings for alexanders.

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The flowering and fruiting of elephant-ear taro (*Alocasia brisbanensis*, Araceae) in Auckland

Rhys Gardner

Introduction

For a few years now I have been gardening with this large Australian aroid, enjoying in particular the delicious scent of its summer-long flowering. Visitors though have suggested that this plant is really a "space invader poised to take off" and become as much of a weed as its relative, *Zantedeschia aethiopica* (arum lily). All I have been able say in defence is that currently it seems to be spreading only by detached pieces of rhizome (admittedly, such new colonies can be vast, as along the Waikato River near Puni).

To learn more I have experimented on two alocasia colonies, one at Sandringham and the other at Green Bay (possibly these represent the same clone). In this I have been guided by the research of plant pathologist Dorothy Shaw (see Johnson et al. 2008) who in her retirement in Brisbane focussed on the plant's reproductive biology and its interactions with various Australian animals. Until its endemic status was realized it featured in her writings as the Indo-Pacific food-plant *A. macrorrhizos* (Hay & Wise 1991).

Flowering (Fig. 1)

Bown (1988) gives a popular but thorough survey of the family's floral biology. The morphology and periodicity of flowering of *A. brisbanensis* was discussed more technically by Shaw & Cantrell (1983) and Shaw (2004). My own observations on the Auckland plantings more or less agree with the latter two accounts (making some allowance for climatic differences), and can be summarized as follows:

— Flowering begins in early November and ends in March (or even late April if the weather is warm enough, as in 2012). If the stem is a well-positioned one (full sun, plenty of water) it produces c. 7–9 inflorescences over this time. There is no overlap in the flowering of successive inflorescences on the one stem; typically, at mid-season, a new inflorescence opens several days after the male phase of the previous one is over.

— The first phase of flowering is a female one: the base of the spathal limb (the flared part of the spathe) is open, that is, there is a gap of nearly 5 mm between it and the central sterile zone of the spadix, with the female flowers down in the spathal chamber exposed to pollen brought in by wind or insects.

— After 3–4 days the base of the spathal limb contracts to close the gap at the sterile zone, and pollen begins to be extruded from the male flowers. The pollen grains, white and minutely spinulose, tend to cohere, and Shaw and Cantrell (1983) aptly describe these extrusions of pollen as "cirri". The female flowers at this stage gradually become covered in a milky fluid. The spathal limb begins to change from green to yellow and starts to wilt, and the scent, which has been so intense up to now, fades as well. (My experiments on excised portions

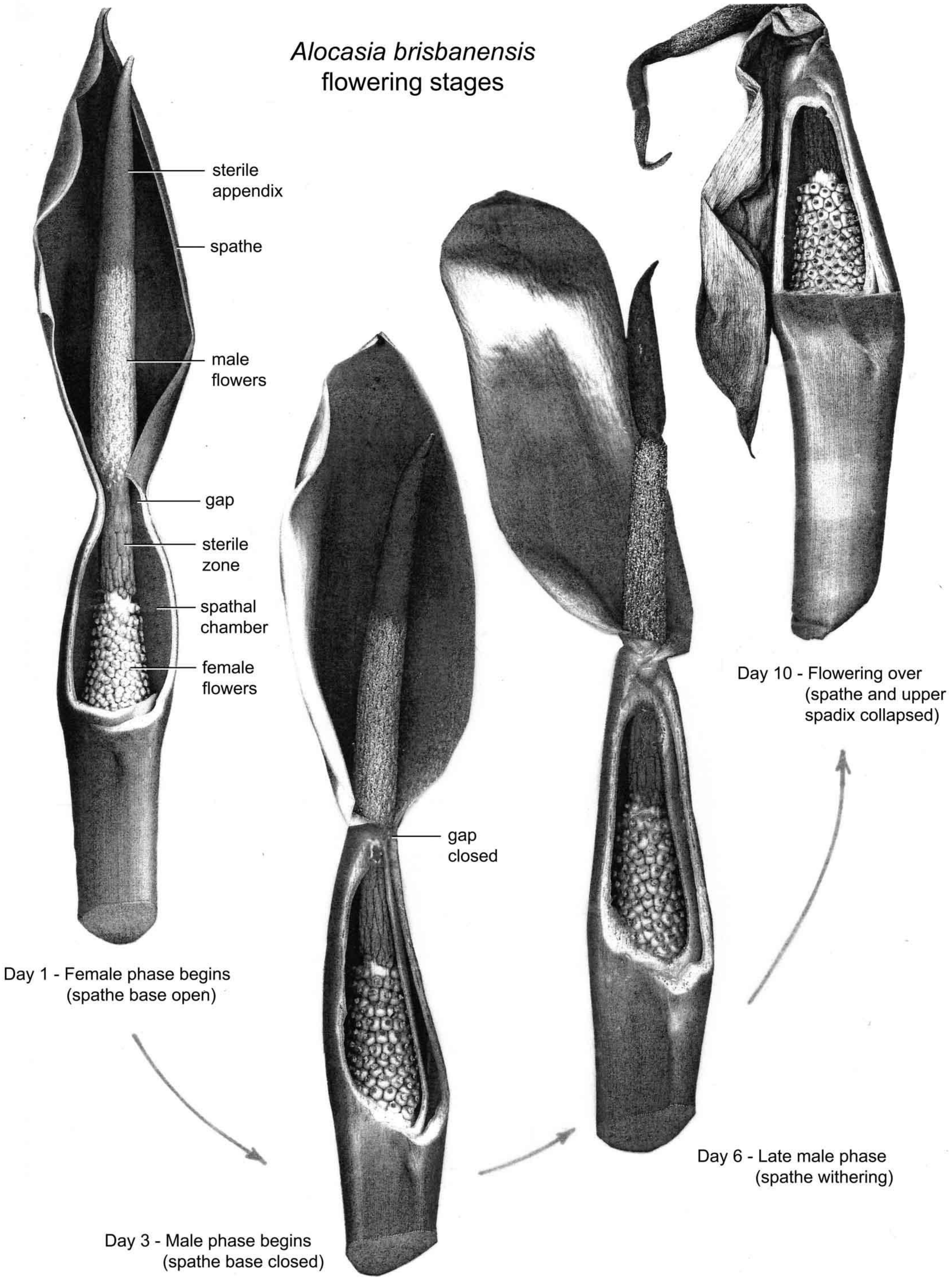

Fig. 1. Sequence of flowering in *Alocasia brisbanensis* (fresh material cut and photocopied by the author, to show the parts hidden by the base of the spathe).

of the inflorescence at an earlier stage show that the spathe itself emits a "minty" odour, while the sterile appendix of the spadix emits a rather different "soapy" one).

Fruiting
The most salient finding of Shaw and Cantrell (1983) for Australian plants was that although wind-pollination and/or self-pollination did occur, by far the main part of the seed-set resulted from pollination by several kinds of insect. In my plants however I have never seen insects (other than thrips) in the spathal chamber, nor have I seen insect visitors to the male flowers, not even honey-bees.

Each season's earliest one or two inflorescences, and sometimes the last one or two as well, are sterile and soon wilt and rot. The others almost always mature a good complement (c. 100) of the red fruitlets. These are exposed almost exactly 4 months after flowering, when the spathal chamber tears in broad strips back down to its base and the peduncle curves back over towards ground level. The seeds (one per fruitlet) always appear to be well-formed, and a sample from the single fruit-head I tested gave 100 % germination.[1]

To resolve the discrepancy between the suggestion of a requirement for insect pollination and the lack of insect-visitors in Auckland I experimented on a number of mid-season inflorescences. All were kept in fine muslin bags from their earliest appearance. In some the male part of the spadix was excised at the "open base" (female) stage. In the others the base of the spathal limb was plugged with cotton wool. Both treatments prevent pollen (self or other) from reaching the female flowers. In no case was any fruit set. Because bagged controls produced abundant fruit I conclude that my plants are largely or entirely self-pollinating. In agreement with this is that in the bagged controls it was not uncommon for some of the fruitlets to remain undeveloped. These were not placed in random over the cylindrical surface of the fruit, but occurred in a more or less vertical strip, as though pollen had not been able to fall down from above in that sector.

The question remains then: why isn't this plant spreading through the bush in company with *Zantedeschia* ? I have not seen birds feeding on the infructescence of either species, but it seems reasonable to suppose that if blackbirds (say) have learnt to feed on *Zantedeschia* it would not be long before they took to the alocasia too. And Peter de Lange has reminded me that on Raoul I. (Kermadec Is.) the latter species is certainly spreading by seed — but how?

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[1] c. 50 seeds (removed from their fleshy covering), sown in a seed-tray outdoors, late winter; all germinated within 6 weeks.

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How to look at *Macropiper* (Piperacaeae)

Rhys Gardner

Introduction
Molecular-taxonomic work on the Piperaceae has found that *Macropiper* comprises the major part of a basally-originating lineage (Jaramillo et al. 2008). Consequently, the suggestion is that it be reduced in rank, to coordinate with infrageneric status for another nine or so lineages in *Piper* broadly conceived. Names in *Piper* for *M. excelsum* and other New Zealand macropipers are listed by de Lange (*New Zealand Journal of Botany*, in press).

A.C. Smith's revision of *Macropiper* (Smith 1975)[1] had concluded just the opposite, that generic status was fully deserved. The present article does not debate the merits of a change in rank; rather, it attempts to bring Smith's morphological observations, notably