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NATURAL HYBRIDS IN THE GENUS *ALOE* (ALOEACEAE) IN EAST AFRICA

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ABSTRACT

Natural hybrids can arise in the genus *Aloe* because their chief pollinators, sunbirds, are not species-specific when feeding on nectar. From literature and the observations of the writer and others, 16 cases of known or suspected natural interspecific hybrids in East Africa are recorded.

INTRODUCTION

In his monumental account of the genus *Aloe*, Reynolds (1950, 1966) mentioned a number of interspecific hybrids that he and others had found in the field. Most of these references are in the first volume, covering the aloes of the Republic of South Africa and a few neighbouring territories. Presumably this is because Reynolds lived in South Africa and was able to spend more time assessing variation of populations in the field. He mentioned very few natural hybrids in East Africa, and no voucher specimens were cited. Some other hybrids were noted briefly by Carter (1994).

Individuals or small numbers of plants that do not match known species, and grow within the distribution range of two or more known species, should be considered as being possibly of hybrid origin. It is not necessary for the parent plants to be growing very close together. *Aloe* flowers are generally regarded as classic examples of ornithophilous flowers, with such features as tubular perianth, red/orange/yellow colours, absence of scent, and abundant nectar. Sunbirds are frequently seen attracted to aloe flowers, both in the field and in the garden. As they can fly considerable distances and they are not species-specific when feeding, these birds can easily cross-pollinate plants that are growing some distance apart.

One of the main clues to possible hybridity is that the plant will usually be partly or entirely sterile, and this can be seen from shrivelled anthers with low pollen fertility, and from poor or failed fruiting. A comparison with the species known to occur in the vicinity might also reveal that the plant is somewhat intermediate between two of those species in its morphology. A more thorough investigation will include a detailed morphological examination of the hybrid and putative parents, chromosome studies, comparison of chemical composition of leaf exudates, and several experimental techniques, including attempted resynthesis of the suspected hybrid by artificially crossing the putative parents. Unfortunately, such an investigation can take several years to carry out, as it involves waiting for seedlings to grow to maturity and come into flower. When hybrids are at least partially fertile, back-crosses with one or both parents can appear, leading to a hybrid swarm. Such situations are a little more difficult to sort out. Hybrid swarms in which there appear to be three parent species with various plants of intermediate character are even more of a challenge.

The aim of this review is to list the known or suspected natural *Aloe* hybrids in East Africa,

including new records not previously reported, with observations on characters of some of them. The putative parent names are in alphabetical order, with all names indexed in an appendix. Authors of plant names are given in the appendix. It is hoped that this review will act as a stimulus for further observations on natural hybrids.

LIST OF KNOWN OR SUSPECTED HYBRIDS

Location of voucher specimens:

EA = East African Herbarium, National Museums of Kenya, Nairobi.

K = Herbarium, Royal Botanic Gardens, Kew, England.

1. *A. amudatensis* x *A. tweediae*

UGANDA, Northern Province, Karamoja District, Amudat, *Tweedie 660* (K). (Reynolds, 1966; Carter, 1994)

Amudat is the type locality for both of these species, which also occur in north-west Kenya.

2. *A. bukobana* x *A. macrosiphon*

TANZANIA, Bukoba District, north of Biharamulu. No voucher specimen cited. (Reynolds, 1966)

3. *A. elgonica* x *A. wollastonii*

KENYA, Rift Valley Province, Trans Nzoia District, Kipuyon River Bridge, near Kitale. No voucher specimen cited. (Reynolds, 1966)

Reynolds referred to the second parent as *A. lateritia* Engl., but plants around Kitale previously included in this species are now called *A. wollastonii* (Carter, 1994).

4. *A. francombei* x *A. secundiflora*

KENYA, Rift Valley Province, Laikipia District, Ol Ari Nyiro Ranch. No voucher specimen. (King, personal communication)

Found by Elizabeth King. No further details available at present.

5. *A. kedongensis* x *A. secundiflora*

KENYA, Rift Valley Province, Nakuru District, Naivasha. No voucher specimen cited. (Carter, 1994)

6. *A. kedongensis* x *A. secundiflora* hybrid swarm

KENYA, Rift Valley Province, Narok District, grassy bank on west side of Seyabei Gorge, 1° 6' S, 35° 57' E, 1830 m alt., 21 Nov. 1992, *Newton 4160, 4161, 4162, 4163* (cult.). (Carter, 1994)

This very variable population of shrubby plants, which probably includes some back-crossing, still requires investigation.

7. *A. labworana* x *A. tweediae*

UGANDA, Northern Province, Karamoja District, Labwor Hills. No voucher specimen cited. (Reynolds, 1966)

Reynolds referred to the first parent as *A. schweinfurthii* Baker var. *labworana* Reynolds, but this taxon was raised to specific rank by Carter (1994).

8. *A. lateritia* var. *graminicola* x *A. nyeriensis*

KENYA, Rift Valley Province, Laikipia District, Suguroi Bridge, 0° 4' S, 36° 36' E, *Brandham 1757, 2094* (K). (Carter, 1994)

Apparent hybrid.

9. *A. lateritia* var. *graminicola*, *A. nyeriensis*, and *A. secundiflora* hybrid swarm

KENYA, Rift Valley Province, Laikipia District, Ngobit Bridge. No voucher specimen. (Brandham, personal communication)

Dr. Peter Brandham once told me of an interesting hybrid swarm that he had seen here. It occurs near the type locality of *A. ngobitensis* Reynolds, now sunk under *A. nyeriensis*. The population has yet to be investigated.

10. *A. lateritia* var. *graminicola* x *A. secundiflora*

KENYA, Rift Valley Province, Laikipia District, 15 km north-west of Nanyuki, on road to Don Dol, 0° 5' N, 37° 1' E, in open thorn bush, 1830 m alt., 16 Sept. 1995, *Newton & Viljoen 5544* (EA, K).

A single flowering specimen of this hybrid was found in a mixed population of *A. lateritia* var. *graminicola* and *A. secundiflora*, both of which were also flowering at the time. It has a rosette like that of *A. secundiflora*, but with a few scattered whitish spots on the leaves. The inflorescence shape is like that of *A. lateritia* var. *graminicola* and the flowers are not secund, but the perianth shape is like flowers of *A. secundiflora*. In pollen samples taken from two flowers and stained with aceto-carmines for examination with a microscope, 26.3% of the grains were found to be small and deformed, and they were assumed to be infertile.

11. *A. macrosiphon* x *A. secundiflora*

TANZANIA, Bukoba District, north of Biharamulu. No voucher specimen cited. (Reynolds, 1966)

The hybrids are reported to produce erect racemes with flowers that are not secund, and Reynolds suggests that production of oblique racemes with secund flowers is a recessive character.

12. *A. ngongensis* x *A. secundiflora*

KENYA, Eastern Province, Machakos District, base of Lukenya Hill, 1° 29' S, 37° 3' E, amongst shrubs near road, 1620 m alt., 11 Dec. 1992, *Newton & Carter 4209* (EA, K). (Carter, 1994)

Several plants that appear to be hybrids occur in a mixed population of *A. ngongensis* and *A. secundiflora* near the southern end of the hill. At the time of my visit, with Susan Carter Holmes, both parent species were in flower. The hybrids have rosettes of leaves like those of *A. secundiflora* but raised on stout stems to 1 metre high. The racemes are capitate like those of *A. ngongensis*, and the flowers are not secund.

13. *A. ngongensis* x *A. volkensii* ssp. *multicaulis*

KENYA, Rift Valley Province, Narok District, Ewaso Ng'iro. No voucher specimen cited. (Carter, 1994)

Possible hybrids.

14. *A. rabaiensis* x ?*A. secundiflora*

TANZANIA, Lushoto/Tanga Districts, Uмба Steppe, cult. Amani, *Greenway 5906 & 6425* (K). (Carter, 1994)

Possible hybrids.

15. *A. rabaiensis* (male) x *A. vituensis* (female)

KENYA, Coast Province, Tana River District, Daka Dakacha, 2° 23' S, 39° 20' E, in dense bush on rocky hill, 320 m alt., 15 Feb. 1990, *Newton & Powys 3570* (EA, K).

Daka Dakacha (Dakotha) is an isolated rocky hill near the northern end of the Galana Ranch, in Coast Province. During a field trip with Gilfrid Powys, a single clump of a shrubby plant with white-spotted leaves was seen growing mixed with a population of *Aloe vituensis*. About 30 metres altitude lower down on the same hill there was also a shrubby aloe with unspotted leaves. This latter is *A. rabaiensis*, which is one of the most common and widespread species of *Aloe* in Coast Province. As the hybrid was growing with *A. vituensis*, a little way away from *A. rabaiensis*, it is assumed that *A. vituensis* is the female parent. In this case the hybrid has inherited the large shrubby growth habit of the male parent, but the spotted leaves of the female parent. The inflorescence is branched, like that of *A. rabaiensis*, but the flowers are in longer racemes than those of the almost capitate *A. rabaiensis*.

16. *A. secundiflora* (female) x ?*A. vituensis* (male)

KENYA, Eastern Province, Meru District, Lewa Downs Ranch, near Isiolo, 28 Jan. 1991, *Raymer s.n.* (cult.).

Whilst Dee Raymer and I were exploring a rock outcrop on which there was a population of *Aloe secundiflora*, Dee drew my attention to a plant she had found that had white-spotted leaves, though otherwise looking just like *A. secundiflora*. No other *Aloe* species was seen there, but on the previous day we had seen *A. vituensis* in another area further north in the ranch. The plant flowered later in Dee's garden, with an inflorescence more like that of *A. vituensis*. If the hybrid status of this plant is confirmed, *A. secundiflora* was clearly the female parent. In this case the hybrid has inherited the growth habit of the female parent, and the spotted leaves and some inflorescence characters of the male parent.

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APPENDIX: List of putative parent taxa and index to hybrids

- Aloe amudatensis* Reynolds — 1
Aloe bukobana Reynolds — 2
Aloe elgonica Bullock — 3
Aloe francombei L.E. Newton — 4
Aloe kedongensis Reynolds — 5, 6
Aloe labworana (Reynolds) S. Carter — 7
Aloe lateritia Engl. var. *graminicola* (Reynolds) S. Carter — 8, 9, 10
Aloe macrosiphon Baker — 2, 11
Aloe ngongensis Christian — 12, 13
Aloe nyeriensis Christian — 8, 9

Aloe rabaiensis Rendle — 14, 15

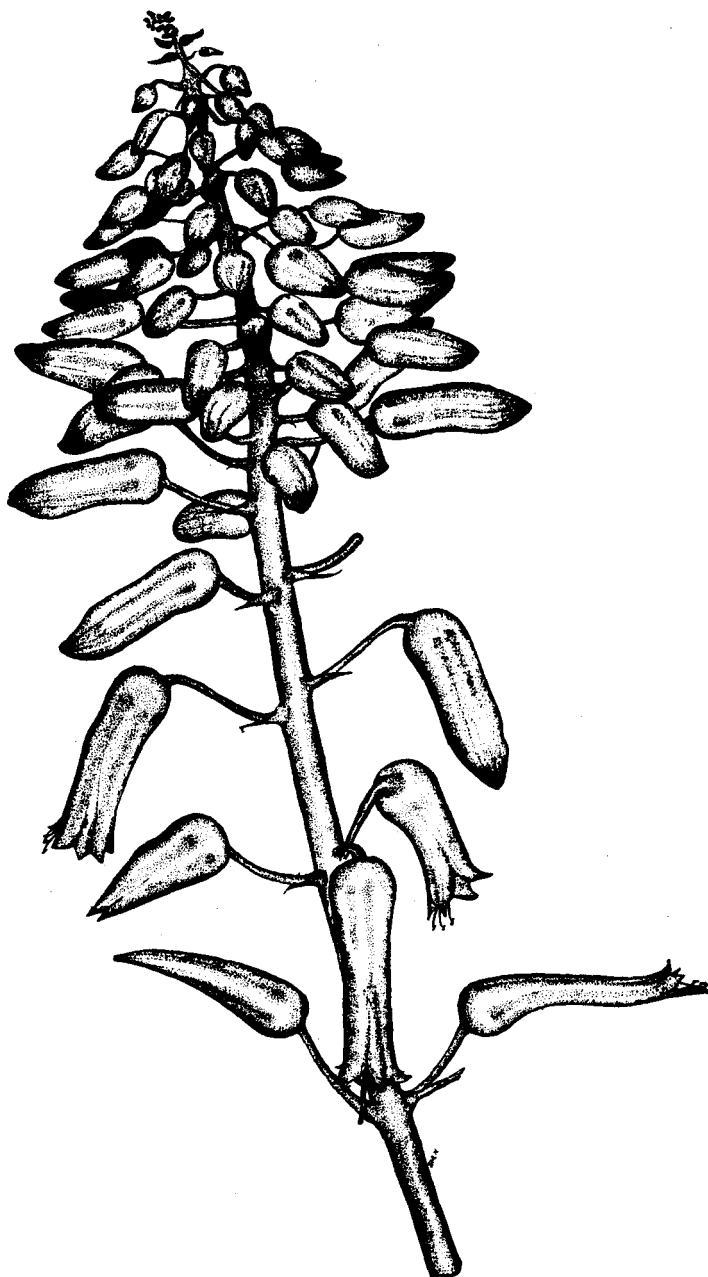
Aloe secundiflora Engl. — 4, 5, 6, 9, 10, 11, 12, 14, 16

Aloe tweediae Christian — 1, 7

Aloe vituensis Baker — 15, 16

Aloe volkensii Engl. ssp. *multicaulis* S. Carter & L.E. Newton — 13

Aloe wollastonii Rendle — 3



A. secundiflora (female) x ?*A. vituensis* (male)