

# The orchids of Ethiopia and Eritrea

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The orchid flora of Ethiopia and Eritrea comprises 160 species in 37 genera. It is poor in numbers of species and genera in comparison with other parts of tropical Africa. Although 26 endemic species have been recorded, amounting to 16% of the orchid flora, this is considerably less than previous estimates. Most of the orchids are terrestrial and only about a fifth are epiphytic or lithophytic, reflecting the relative aridity of much of the region. Surprisingly, six (23%) of the endemic species are epiphytic. Many Ethiopian and Eritrean orchids are known from one or a few collections in herbaria and, consequently, many are still poorly understood. More targeted collecting will undoubtedly increase the number of species in the flora, and allow a better understanding of their distribution, conservation status and ecology. The *Flora of Ethiopia and Eritrea* account should be considered only as a status report of current rather inadequate understanding of the orchids of the region. A better knowledge of Ethiopian and Eritrean orchids might be a useful conservation tool.

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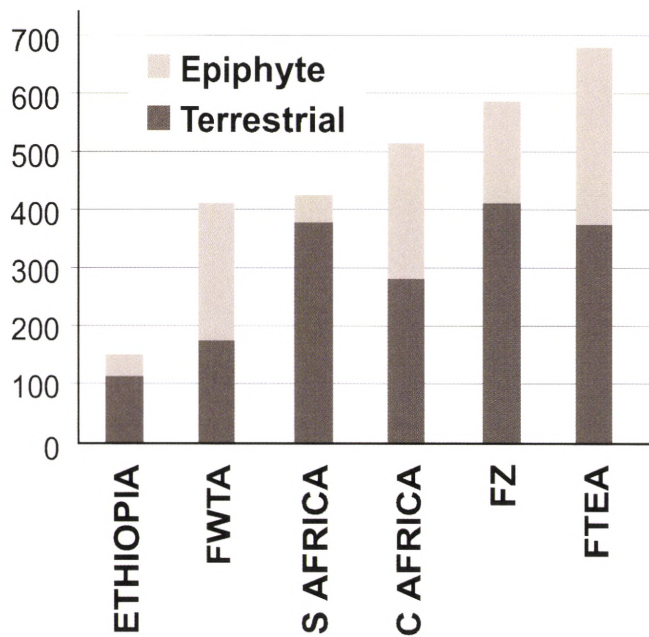
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## Introduction

Orchidaceae are probably the fifth largest family in the *Flora of Ethiopia and Eritrea*, with an estimated 160 species in 37 genera (Table 1, after Friis *et al.* 1982; Cribb & Thomas 1997; Bidgood & Cribb 1999), representing four of the five subfamilies recognised in Pridgeon *et al.* (1999). This estimate represents an increase from the 123 species in 24 genera reported by Tournay (1972).

Compared with other parts of tropical and South Africa, Ethiopia and Eritrea have a rather depauperate orchid flora. Orchid numbers

compare poorly with those of the much richer floras of tropical East Africa (679 spp.), West Africa (413 spp.), Central Africa (517 spp.) and South Africa (425 spp.), as appears in Diagram 1 where the numbers of epiphytes and terrestrials are also shown. Moreover, the orchid flora of the Ethiopian and Eritrean region shows a distinct cline of decreasing richness from the south-west to the north-east (Diagram 2), mirroring the similarly decreasing rainfall patterns; elevation is also a factor (Friis *et al.* 1982). The majority of Ethiopian orchids are terrestrials of the grasslands and woodlands. Only 20%



**Diagram 1.** Number of orchid species in major African floras. ETHIOPIA: Flora of Ethiopia and Eritrea. FWTA: Flora of West Tropical Africa. S AFRICA: Flora of Southern Africa. C AFRICA: Flore d'Afrique centrale. FZ: Flora Zambesiaca. FTEA: Flora of Tropical East Africa.

are epiphytes, and these are mostly confined to the wetter and more forested areas of the west and south-west of the country. Notable amongst the epiphytes are the white-flowered *Aerangis*, such as *A. kotschyana*, *A. brachycarpa* (Fig. 13) and *A. luteo-alba* var. *rhodosticta* (Fig. 14), three of the few Ethiopian species likely to be seen in living orchid collections.

Collectors such as R. Quartin-Dillon, W.G. Schimper and H. Steudner made some of the earliest collections of tropical African orchids in the Ethiopian and Eritrean region. Thus we have *Bonatea steudneri*, *Habenaria schimperiana*, *Diaphanthe schimperii* and *Eulophia quartiniana* (now considered conspecific with *E. guineensis*). Despite this, the diversity of the orchid family, and the popularity it has with collectors, the orchids of the region are still poorly represented in herbaria: 25 (16%) have been collected once and a further 29 have been collected only twice (c. 18%). The majority of the remaining species are known from ten or less collections. Some orchids admittedly are diffi-

cult to collect *e.g.* *Nervilia* which flower after the leaf has withered, and the fleshy and leathery leaved species which make poor herbarium specimens. Others flower at times when collecting is difficult such as during the rainy season. However, from these figures we can state that the orchids of the region are generally poorly collected and little understood. The forests, particularly of south-west Ethiopia are under-explored and the orchids of the Gamo-Gofa and Ilubabor regions are very poorly represented in herbaria. New records are likely as the remoter regions become better explored. No orchids have yet been recorded from the low, arid lands of the Afar region.

### The larger genera

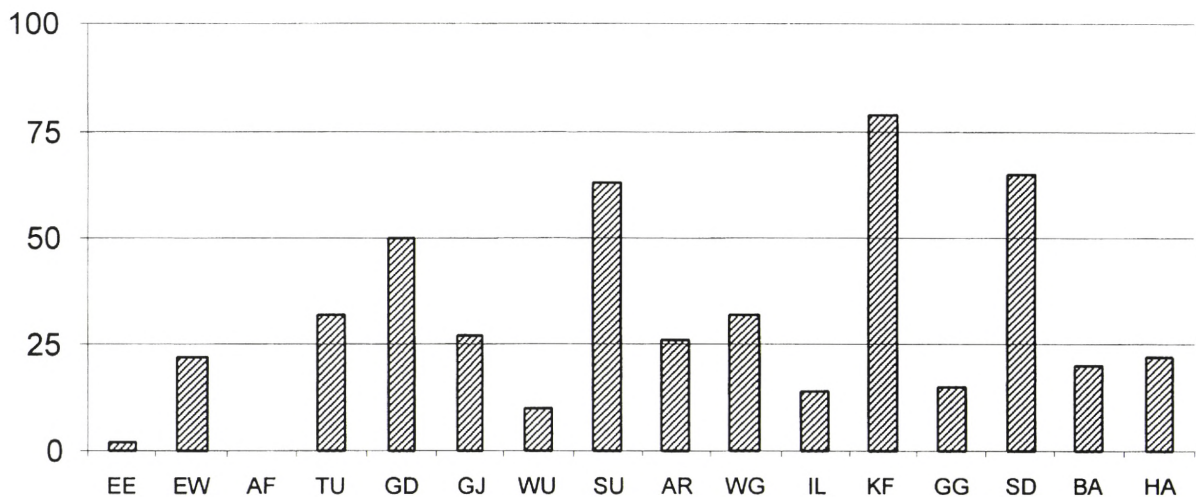
Only three orchid genera are represented by more than ten species in the region: the terrestrial genera *Habenaria* (45 species) and *Eulophia* (19 species), and the predominantly epiphytic *Polystachya* (11 species).

Table 1. Numbers of Ethiopian orchids by genus.

GENUS	TOURNAY (1972)	CURRENT NO. OF SPECIES	TERRESTRIAL (T) OR EPIPHYTIC (E)	EндеMICs
<i>Cheirostylis</i>	–	1	T	
<i>Corymborkis</i>	–	1	T	
<i>Holothrix</i>	11	7	T	1
<i>Brachycorythis</i>	1	3	T	
<i>Cynorkis</i>	2	2	T	
<i>Habenaria</i>	36	45	T	10
<i>Bonatea</i>	2	2	T	
<i>Platycoryne</i>	1	1	T	
<i>Roeperocharis</i>	4	3	T	2
<i>Disa</i>	5	4	T	
<i>Satyrium</i>	7	7	T	1
<i>Disperis</i>	5	6	T	3
<i>Epipactis</i>	3	2	T	
<i>Nervilia</i>	2	3	T	
<i>Vanilla</i>	–	1	T	
<i>Platylepis</i>	–	1	T	
<i>Malaxis</i>	–	1	T	
<i>Oberonia</i>	–	1	E	
<i>Liparis</i>	1	3	T	1
<i>Polystachya</i>	8	12	T	3
<i>Stolzia</i>	–	2	E	1
<i>Bulbophyllum</i>	2	4	E	
<i>Oeceoclades</i>	–	2	E	
<i>Pteroglossaspis</i>	1	1	T	
<i>Eulophia</i>	18	19	T	2
<i>Graphorkis</i>	–	1	E	
<i>Calyptrochilum</i>	1	1	E	
<i>Angraecum</i>	1	3	E	
<i>Microcoelia</i>	1	1	E	
<i>Diaphananthe</i>	4	6	E	1
<i>Bolusiella</i>	–	1	E	
<i>Aerangis</i>	5	5	E	
<i>Rangaeris</i>	1	1	E	
<i>Cyrtorchis</i>	1	2	E	1
<i>Ancistrorhynchus</i>	–	1	E	
<i>Angraecopsis</i>	–	3	E	
<i>Tridactyle</i>	–	1	E	
<b>Total</b>	<b>123</b>	<b>160</b>		<b>26</b>

A cosmopolitan genus, *Habenaria* is particularly well-represented in tropical Africa with possibly 300 species. With twice as many species as *Eulophia*, the next largest genus in the region, it boasts over one-third of the

Ethiopian orchid flora. Several sections are represented by one or two species in Ethiopia, for example, *Habenaria cornuta*, of section *Ceratopetalae*, is a terrestrial found in *Combretum-Terminalia* woodland and *Habenaria macrura*, of



**Diagram 2.** Number of orchid species in the regions used to indicate distribution in the *Flora of Ethiopia and Eritrea*. For abbreviations, see Edwards, Mesfin Tadesse & Hedberg (1997). The southern, especially Sidamo, southwestern, especially Kefa, and central flora regions, especially the uplands of Shewa, have the highest number of species, the eastern and northern flora regions the lowest numbers.

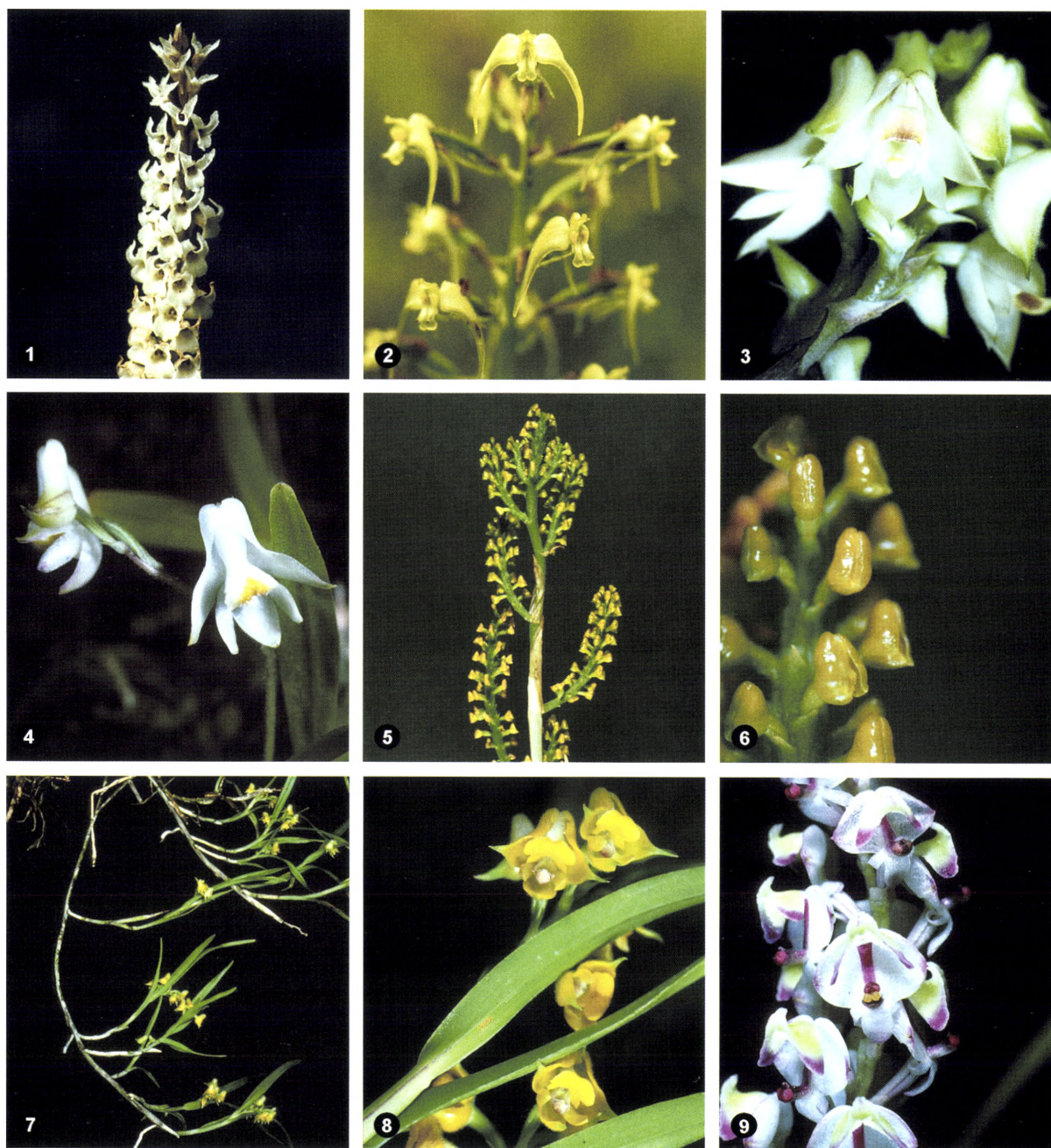
sect. *Macrurae*, is a species of seasonally wet grassland. For these and many others, Ethiopia represents the northern extent of the range of the species. In contrast, Ethiopia appears to be a centre of diversity for section *Multipartitae* with 11 species. Some of the most impressive members of the genus belong in this section such as the appropriately named *H. excelsa*, *H. praestans*, and *H. decorata*.

*Eulophia* is represented by 19 species (almost 12%). Most of these are widespread species in tropical Africa such as *E. cucullata* and *E. odontoglossa*, while a few, such as *E. streptopetala* and *E. speciosa*, are found throughout East Africa south to South Africa. The remarkable *E. petersii*, also widespread in East and South Africa, grows in some of the most arid conditions tolerated by orchids. It somewhat resembles a *Sansevieria* when not in flower and is equally tolerant of drought because of its stout pseudobulb and succulent leaves.

*Polystachya*, another pantropical genus with its centre of diversity in tropical Africa, is

mainly epiphytic but some species can also be found growing as lithophytes. Eleven species are found in Ethiopia. Most are plants of moist woodland or forest such as *P. lindblomii* (Fig. 7-8), *P. paniculata* (Fig. 10) and *P. golungensis* (Figs. 5-6), but some such as *P. eurychila* (Fig. 9) and *P. steudneri* can survive relative aridity by losing their leaves in the dry season. Several of the Ethiopian species are widespread in tropical Africa, such as *P. cultriformis* and *P. bennettiana* (Fig. 3), but most are more restricted in their distribution, a frequent feature of *Polystachya* in Africa.

Many of the other genera, whilst common in tropical Africa, are only represented by one to a few species in Ethiopia, e.g. *Platycoryne*, *Brachycorythis*, *Disa*, *Satyrium*, *Microcoelia*, *Tridactyle* and *Cyrtorchis* (Fig. 12). The large genus *Angraecum* is represented by a few very different species: the miniature orchids *A. humile* and *A. minus*, and at the other end of the scale *A. infundibulare* (Fig. 18), one of the largest flowered orchids on the African continent.



**Fig. 1.** *Holothrix unifolia* (Rchb. f.) Rchb. f. (Shewa, Entoto Hills, DEBL 73-13). **Fig. 2.** *Habenaria cultriformis* Kraenzl. (Sidamo, SE of Neghelle, Friis *et al.* 72-917). **Fig. 3.** *Polystachya bennettiana* Rchb. f. (Bale, N of Masslo, FV 84038). **Fig. 4.** *Polystachya caduca* Rchb.f. (Bale, N of Masslo, FV 84053). **Figs. 5-6.** *Polystachya golungensis* Reichb. f. (Kefa, E of Bonga, DEBL 73-57 = Friis *et al.* 73-2321). **Figs. 7-8.** *Polystachya lindblomii* Schltr. (Kefa, Bebeke Forest, FV 84094). **Fig. 9.** *Polystachya eurychila* Summerh. (Bale, 20 km N of Masslo, FV 84030). Vouchers at C; collectors: DEBL and Friis & *al.* year 1972; I. Friis, F. N. Rasmussen, K. Vollesen & G. Aweke. FV: I. Friis, K. Vollesen & M. Gilbert year 1984. Photos by Finn N. Rasmussen.



## Biogeographical affinities

Three-quarters of Ethiopian species also occur in the *Flora of Tropical East Africa* (FTEA) region *i.e.* Kenya, Uganda and Tanzania. A comparison of the two regions shows that whilst the FTEA orchid flora has a much higher proportion of epiphytes, the Ethiopian flora is dominated by terrestrials (Diagram 1).

65 species (c. 41%) are common to both Ethiopia and West Africa. Excluding the pan-African species, the West African connection is less marked with 17 species (c. 11%) being found in West Africa and Ethiopia.

Twenty of the 23 orchid species recorded from the Arabian Peninsular also occur in Ethiopia (Cribb 1979; Thomas 1992), the majority of them being confined to the highlands of the Yemen. Amongst these is the remarkable *Epipactis veratrifolia*, often found growing in seepages in near desert-like conditions. It is an orchid of the Middle East and eastern Mediterranean, the only species from the region that also occurs in Africa. It is also found in Somalia, in an orchid flora of eleven species of which ten species are also found in Ethiopia (Pettersson 1995).

Of particular interest has been the recent discovery of *Vanilla roscheri* by Sally Bidgood and Ib Friis collected from Gamo-Gofa region of south-western Ethiopia at 1050 m a.s.l. It was growing in sandy soil in *Acacia* bushland with scattered evergreen shrubs with an annual rainfall of c. 900 mm, similar to its habitats in Kenya and coastal Tanzania (Bidgood & Cribb 1999).

In this area it was apparently locally common. Apart from suggesting that a thorough survey of the orchid flora would reveal much that is currently unrecorded, the disjunct distribution of this species between the East African coast and southern Ethiopia is noteworthy and reminiscent of the distribution of some other flowering plants such as *Portulaca petersii* (Portulacaceae), *Ruellia amabilis* (Acanthaceae) and *Abelmoschus ficulneus* (Malvaceae).

## Endemism

Tournay (1972) reported 50 endemic orchids in a flora of 123 species, *i.e.* about 40% endemism. The current study indicates that this is an overestimate: 26 species, just under 17% of the region's orchids, are endemic (see Diagram 3). Of these, 20 are terrestrial and only 6 are epiphytic (Table 2). If those orchids shared by Ethiopia and the Yemen are included another five species can be added. A further 10 Ethiopian species are endemic if adjacent Kenya, Uganda and Sudan are included.

Nine species of *Habenaria* are endemic, including *Habenaria cultriformis* (Fig. 2), *H. vollesenii*, *H. gilbertii*, *H. montolivaea*, *H. taenioidema* and *H. excelsa*, all montane grassland species. Amongst the other endemic terrestrial species are three of *Disperis*, two species each of *Roeperocharis* and *Eulophia*, *Satyrium aethiopicum*, which is found at between 2000 and 2500 m elevation in the highlands of Ethiopia, *Holothrix unifolia* (Fig. 1), and *Liparis abyssinica* (known only from the type collection).

← **Fig. 10.** *Polystachya paniculata* Lindl. (Kefa, at Bako river, FV 84102). **Fig. 11.** *Diaphananthe tenuicalcar* Summerh. (Bale, N of Masslo, FV 84065). **Fig. 12.** *Cyrtorchis arcuata* (Lindl.) Schltr. (Kefa, Bebeke Forest, FV 84086). **Fig. 13.** *Aerangis brachycarpa* (A. Rich.) Dur. & Schinz (Illubabor, S of Gore, DEBL 72-29). **Fig. 14.** *Aerangis luteo-alba* (Kraenzl.) Schltr. var. *rhodosticta* (Kraenzl.) J. Stewart (Kefa, Bonga, DEBL 73-53). **Fig. 15.** *Diaphananthe adoxa* F. Rasm. (Kefa, Bonga, DEBL 73-52 (type)). **Fig. 16.** *Angraecopsis holochila* Summerh. (Sidamo, N of Kebre Mengest, DEBL 72-04). **Fig. 17.** *Angraecopsis cf. trifurca* (Rchb. f.) Schltr. (Illubabor, 15 km E of Tepi, FV 84109). **Fig. 18.** *Angraecum infundibulare* Lindl. (Illubabor, 15 km E of Tepi, FV 84108). Vouchers at C; collectors: DEBL and Friis *et al.* year 1972: I. Friis, F. N. Rasmussen, K. Vollesen & G. Aweke. FV: I. Friis, K. Vollesen & M. Gilbert year 1984. Photos by Finn N. Rasmussen.

**Table 2.** Endemic and near endemic orchids in the Ethiopian Flora. For abbreviations used to indicate distribution, see Edwards *et al.* (1997).

Species	Distribution	Altitudinal range (m)
<i>Holothrix squammata</i> (A.Rich.) Rchb.f.	GD, GJ, SU, AR, SD, Uganda, Sudan	2400-2800
<i>Holothrix unifolia</i> (Rchb.f.) Rchb.f.	GD, SU	2500-2900
<i>Habenaria montolivaea</i> Kraenzl. ex Engl.	AR, GD, SU, WU	1000-2600
<i>Habenaria platyanthera</i> Rchb.f.	GD	Unknown
<i>Habenaria cavatibrachia</i> Summerh.	BA, Kenya, Uganda	2100-2700
<i>Habenaria tricruris</i> (A.Rich.) Rchb.f.	AR, EW, GJ, SD, SU, TU	2000-3000
<i>Habenaria aethiopica</i> S.Thomas & P.J. Cribb	GJ, KF, SU, WG	2250-2450
<i>Habenaria decorata</i> A.Rich.	AR, GD, GJ, SU, WU, Uganda, Kenya	2200-3800
<i>Habenaria quartimiana</i> A.Rich.	BA, GD, SU, TU, Uganda, Kenya	2100-2600
<i>Habenaria gilbertii</i> S.Thomas & P.J. Cribb	SU	2100
<i>Habenaria macrantha</i> A.Rich.	AR, BA, EW, GD, GJ, SD, SU, WU, Uganda, Kenya, Somalia, Yemen	1900-3100
<i>Habenaria taeniodema</i> Summerh.	GJ	3150-3500
<i>Habenaria excelsa</i> S.Thomas & P.J. Cribb	GJ	3150-3500
<i>Habenaria vollesenii</i> S.Thomas & P.J. Cribb	SD	1200-1575
<i>Habenaria antennifera</i> A.Rich.	GJ, KF, SU, TU, Yemen	2000-3300
<i>Habenaria cultrata</i> A.Rich.	EW, SU, TU, Yemen, Oman	1700-2100
<i>Habenaria cultriformis</i> Kraenzl.	GG, HA, KF, SD, TU, Yemen	1140-2200
<i>Habenaria rivae</i> Kraenzl.	SD	Unknown
<i>Habenaria perbella</i> Rchb.f.	EW, GD, TU	1200-1500
<i>Habenaria decumbens</i> S.Thomas & Cribb	AR, SD	1900-2600
<i>Roeperocharis alvicornis</i> Kraenzl.	AR, GD, TU	2600
<i>Roeperocharis urbaniana</i> Kraenzl.	GD	2750
<i>Disa pulchella</i> Hochst. ex A.Rich.	AR, BA, GD, GJ, SD, Yemen	1800-3800
<i>Satyrium aethiopicum</i> Summerh.	KF, SD, SU, TU, WG	2000-2500
<i>Satyrium brachypetalum</i> A.Rich.	AR, SD, SU, TU, Yemen	2000-2500
<i>Disperis crassicaulis</i> Rchb.f.	GD, HA, SD, SU, TU	2000-2500
<i>Disperis galerita</i> Rchb.f.	GD, GJ, SD	2000-3800
<i>Disperis meirax</i> Rchb.f.	GD	3500-3800
<i>Liparis abyssinica</i> A.Rich.	TU	Unknown
<i>Polystachya rivae</i> Schweinf.	EW, KF, SU, WG	1770-2490
<i>Polystachya aethiopica</i> P.J. Cribb	AR, SU, SD, KF, IL	1350-2200
<i>Polystachya caduca</i> Rchb.f.	AR, BA, GD, KF, SD, SU, WG	2400-2600
<i>Polystachya eurychila</i> Summerh.	AR, KF, SD, SU, Uganda, Kenya	1700-2000

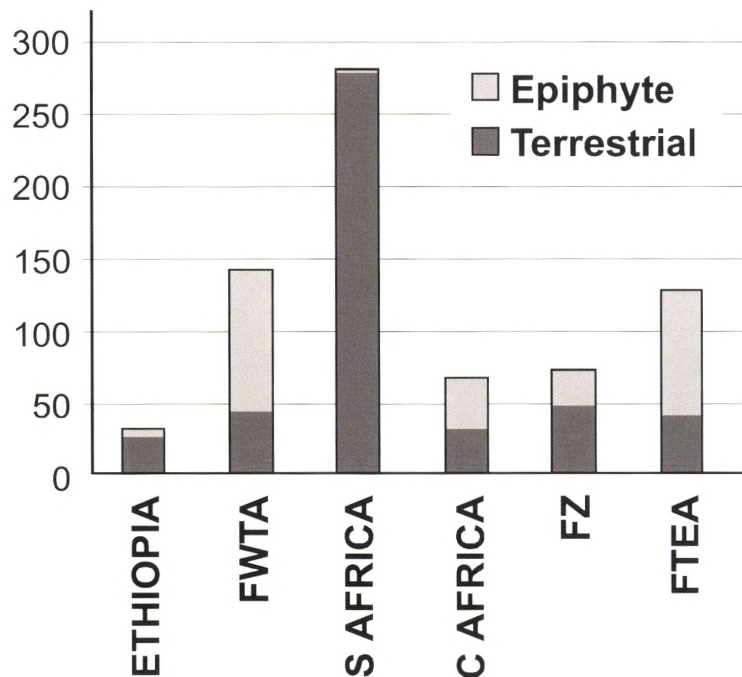
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Species	Distribution	Altitudinal range (m)
<i>Stolzia grandiflora</i> P.J. Cribb	BA, SD, SU, WG	1900-2850
<i>Eulophia abyssinica</i> Rchb.f.	EW, GD, GJ, KF, SD, TU	2250-2600
<i>Eulophia albobrunnea</i> Kraenzl.	AR, BA, GJ, KF, HA, SD, SU, WU	1600-2500
<i>Diaphananthe adoxa</i> Rasmussen	BA, IL, KF, SD, WG, Kenya, Uganda	1300-2300
<i>Diaphananthe candida</i> P.J. Cribb	KF, SD, WG	2000-2100
<i>Diaphananthe schimperiana</i> (A.Rich.) Summerh.	AR, BA, GD, HA, KF, SD, SU, Sudan, Uganda	2100-2850
<i>Diaphananthe tenuicalcar</i> Summerh.	GD, GJ, KF, SD, SU, WG, Kenya, Uganda	1350-2400
<i>Cyrtorchis erythraeae</i> (Rolfe) Schltr.	EW, KF, SD	1350-1700
<i>Angraecopsis holochila</i> Summerh.	GD, SD, TU, Uganda	1500-2300

Endemic epiphytes include *Stolzia grandiflora*, a large-flowered member of tiny, creeping, peperomia-like epiphytic genus related to the Asiatic genus *Eria*, three species of *Polystachya*, including the common *P. caduca* (Fig. 4), probably the most frequently collected

Ethiopian orchid, and *P. aethiopica*. The Afro-Madagascan group of monopodial orchids known as “angraecoids” has some interesting endemics in this region, including the poorly understood *Cyrtorchis erythraeae*, the charming but rare *Diaphananthe candida* that resembles a



**Diagram 3.** Number of endemic orchid species in major African floras. ETHIOPIA: Flora of Ethiopia and Eritrea. FWTA: Flora of West Tropical Africa. S AFRICA: Flora of Southern Africa. C AFRICA: Flore d’Afrique centrale. FZ: Flora Zambesiaca. FTEA: Flora of Tropical East Africa.

small *Aerangis*, *D. tenuicalcar* (Fig. 11), and the frequent but tiny *D. adoxa* (Fig. 15), known only from a few collections outside Ethiopia. The vaguely defined genus *Angraecopsis* has a species that is almost exclusively Ethiopian, *A. holochila* (Fig. 16), and two collections of a relatively large-flowered broad-leaved species that have been identified as *A. trifurca* (Fig. 17), otherwise known only from Zambia and Grande Comore (Rasmussen 1978; unpublished observations). More collections of this entity are much needed.

## Conclusions

Although Ethiopian orchids have been relatively well documented in the literature over many years compared with other families (Richard 1850; Tournay 1972; Cribb & Thomas 1997), they are still rather poorly understood. For example, little can be said of their biology, ecology and conservation status, although at first sight many would appear to be rare. We suspect that the epiphytes are particularly threatened because of widespread felling of Ethiopia's remaining woodlands and forest. However, the evidence is flimsy and more detailed surveys are urgently needed to assess the status of these species.

Novelties will most likely continue to be added to the Flora and would suggest that specialised field work aimed at the orchids would be particularly productive.

Orchids have been widely used elsewhere to highlight the importance of plant conservation and to protect orchid-rich habitats, thereby protecting other plants and animals in those places. A better understanding of the orchids of the region may be useful in helping protect its biodiversity (Hagsater & Dumont 1996). For example, orchids, particularly if they contain showy, rare or endemic orchids, can be used as an education tool, in raising public support

and funding for conservation, in pin-pointing areas worthy of conservation, and for ecotourism.

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