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**Gensyn med Ginir - etiopisk feltarbejde efter 30 års venten.**

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## Revisiting Ginir - Ethiopian fieldwork resumed after 30 years exclusion

By Ib Friis and Odile Weber

In the late 19<sup>th</sup> and early 20<sup>th</sup> century, there were many studies of plant from the tropical countries colonized by European states. These studies resulted in flora-handbooks, meant to provide identification of the useful, or sometimes harmful plants of the colonies. However, two important tropical countries avoided colonization: Thailand in Asia and Ethiopia in Africa. For both countries the efforts to write a flora started only late in the 20<sup>th</sup> century. The work came about at the initiative of botanists from the two countries, in cooperation with researchers from Europe. In both cases, the Royal Botanic Gardens, Kew, and the Natural History Museum of Denmark supported the research behind these flora-handbooks.

### The Thai and Ethiopian flora projects

In the case of Thailand, the publication of the modern multi-volume flora-handbook started in 1970, and it is not yet completed. In the case of Ethiopia, work began in 1980, and the published flora-handbook in nine volumes was finished in 2009. Ethiopia suffered serious political unrest during the period

of the flora-writing. In 1974, a Marxist-Leninist military government replaced the more than one thousand years old rule by a feudal emperor, to be replaced in turn in 1991 by the present government. The central Ethiopian highlands were well explored before the start of the Ethiopian flora-project, but this was not the case with many parts of the country, particularly the parts near the borders towards Sudan and Kenya, and not the drought-prone, Somali-speaking parts in the east.

### The species-rich, but inaccessible Somali-speaking parts of Ethiopia

Despite climatic instability and frequent droughts, the Somali-speaking lowlands in Ethiopia contain a rich and distinctive flora, but still relatively little is known about it. In 1983 Ib Friis and others participating in the Ethiopian flora project tried to study the area around Ginir. This is part of the boundary zone between the Ethiopian highlands, with stable rainy seasons and mixed and often lush forest and agricultural land, and the Somali lowland with deciduous bushland and dry shrub- or grass-steppe

with short and unstable rainy seasons and long dry seasons. The area is also the border between the highland populations with a history closely related to the old Christian state of Ethiopia, and the western part of the Somali-speaking population of the lowlands, which has peripheral connection to the population of the highlands. Moreover, the area often suffered from ethnic conflicts.

Among the few expeditions, which had visited the area around Ginir before us was an expedition in 1900-1901 with the German zoologists and botanists Carlo von Erlanger, Hans Ellenbeck and Oscar Neumann.<sup>1</sup> The majority of the material from this expedition went to Berlin, where it was lost during the Second World War. The early publication of Erlanger, Ellenbeck and Neumann's material suggested that the area contained a considerable number of species not found anywhere else. New collections from the area were therefore important for the flora work, but difficult to obtain because of the unstable security situation.

<sup>1</sup> After this article went to press in *Naturhistorier*, we discovered that among our collections is a rare species of *Crotalaria*, *C. trifoliolata* Baker, originally discovered by an expedition undertaken by the American big game hunter A. Donaldson Smith a few years before the Erlanger expedition. No other botanist has seen this plant in the field since 1894.

### Botanists sent home by the authorities in the 1980s

Several groups of botanists from the Ethiopian Flora Project arrived at Ginir during the years 1983-84. The botanists carried documents issued by authorities in Addis Ababa to confirm the legitimate objectives of the visits, but in Ginir local civilians and military authorities were worried about unrest in the lowlands, and sent the botanists back to safer parts of Ethiopia. In the years after 1984, the relations between the Ethiopian and the Somali governments deteriorated, which resulted in more and more guerrilla attacks. By 1987, the two countries fought a regular war. Work on the Ethiopian Flora had to be carried out without botanical studies at Ginir.

For some time after the latest Ethiopian revolution in 1991 the situation did not significantly improve, particularly because internal conflicts in Somalia spilled into Ethiopia. The last volume of the Flora of Ethiopia and Eritrea was published before botanists could again visit Ginir and its surroundings.

### New collections and results obtained in 2013

Since then, there have been more conflicts between Ethiopia and Somalia. However, in November 2013 Ib Friis

from the Natural History Museum of Denmark, Odile Weber from the Royal Botanic Gardens, Kew, UK, and Ermias Getachew and Wege Abebe from the Ethiopian National Herbarium, headed for Ginir. We were encouraged by information about a newly built dirt road between Ginir and Imi, and by assurance from Ethiopian colleagues that one could travel along this road without problems. Indeed, we did not encounter problems in 2013, and more than 300 collections of plants were gathered. A set of these collections have been handed over to the Ethiopian National Herbarium in Addis Ababa, and the remaining sets are now shared between the Royal Botanic Gardens, Kew, and the Natural History Museum in Copenhagen.

In the area between Ginir and Sheik Hussein we worked especially in dry *Juniperus* forest and in the transition to the lowland vegetation. The zone is rich in rare species of woody plants, including two species of dragon trees (*Dracaena ellenbeckiana* and *Dracaena ombet*). It was one of the purposes of the trip to study the transition between the dry evergreen forest in the highlands and the deciduous vegetation dominated by the genera *Acacia* (Leguminosae subfam. Mimosoideae) and *Commiphora* (Burseraceae) in the lowland.

In the southern direction from Ginir we crossed over the more than 4,000 meters high Bale Massif, with mossy cloud-forests and dry and cool Afroalpine vegetation, before coming again to the dry and hot *Acacia-Commiphora* vegetation in the lowlands. In this direction, we also found a transition zone between the evergreen forest in the highlands and the dry *Acacia-Commiphora* dominated, deciduous vegetation.

#### **Between Ginir and Imi**

In the extensive areas of lowland between Ginir and Imi we found the largest number of rare species, many which we could only recognise to family in the field. Some, we have already noted, may be new to science. The eastern escarpment of the Ethiopian highlands is steep near Ginir, the transition zone between highland and lowland is therefore narrow, and we came quickly down to the *Acacia-Commiphora* vegetation, which gradually becomes drier and drier towards the east. The landscape slopes gently to the Webe Shebele River, which, near Imi, runs in a flat, sandy valley at an altitude of only 350 m above sea level. Here evaporation is so great that salt sometimes deposits in the soil, and we saw peculiar plants with adaptations to an environment with a long drought.

On the way from the highlands one passes areas with unusual types of rocks, some rich in lime, gypsum and other minerals. Also on these rocks we found very unfamiliar species and plant communities.

#### **Notable adaptations**

The plants with the most remarkable adaptations to the climate between Ginir and Imi are the tuber-bearing lianas, climbing with woody stems, but storing water and nutrients in large tubers, which are half below, half above the surface of the soil. Species belonging to several plant families show this adaptation. The most common and prominent example is *Pyrenacantha malvifolia* (Icacinaceae), seen in the photo on p. 16, but similar tubers and perennial, woody stems exist in, for example, a rare species of Cucurbitaceae, *Momordica sessilifolia* (photo on p. 15).

The leafless shrubs or trees of the genus *Euphorbia* (Euphorbiaceae), which store water and nutrients in trunks and branches, are also examples of extreme adaptation to dry climate. Other woody plants with similar adaptations are small trees with thick branches, in which the water is stored under an insulating bark. Often these trees also shed their leaves in the dry season, or, more rarely, the leaves are succulent and persisting, as

seen in *Commiphora myrrha*, *Limonium distichum* and *Suaeda monoica* (photos on p. 14 and 15).

In this vegetation, there are stemless rosette plants with succulent leaves. The genus *Aloe* provides a number of examples of this adaptation, but we found fewer *Aloe* species in the area around Ginir than expected, only six *Aloe* species out of the more than 40 species known from the whole of Ethiopia. We looked in vain for a small number of additional species known to exist in the area, but are very rare. We did not see many bulbous plants, which are more common in areas with slightly less dry climate.

Another important adaptation to the long, dry season is the annual life-form, which we saw particularly frequently in the low-lying and dry area along the Webe Shebele River near Imi. The annual plants germinate and bloom quickly when the rains come, and seed when it ceases, surviving the dry season as seeds. Many annual grasses use this strategy. The annuals are often only 10-15 cm tall and wither quickly and totally after seeding. *Aizoon canariense*, an annual dicotyledonous species of the family Aizoaceae, uses the same strategy; the fine, yellow carpet covering the ground in the central photo on p. 14 consists entirely of this species.

## What are our key findings?

We had only identified the material from our fieldwork to family or genus when the Danish version of this paper went to press. Therefore, it was too early to say much about our key findings. However, apart from the general ecological observations mentioned above, two features clearly stand out. One being that to the north, east and south of Ginir one encounters a transition zone between the highlands and lowlands with rare evergreen species. A group of botanists now analyse this transition zone for a scientific publication.<sup>2</sup> The second feature is that, along the Webe Shebele River, there is an environment with ecological conditions similar to the dry, sandy parts of southern Somalia. Along the Webe Shebele near Imi we found species otherwise only known from Somalia.

Among our other new observations are the strange hanging branches in flowering individuals of *Euphorbia robecchii* (see the photo on p. 17). There is possibly also a new genus and several new species in the material. Perhaps there are more surprising results, once we get the identifications finalised!

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<sup>2</sup> The transition zone partly overlaps with the lower part of the *Juniperus* forest, approximately where we found the rare species of *Crotalaria* mentioned in the previous note.

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## Legends to map and illustrations

Map on p. 13: The area around Ginir with indication of the sites investigated in 2013. The English names for the vegetation types are as in the "Atlas of the Potential Vegetation of Ethiopia" (2010).

- "Landsby / by": Village or town
- "Lokalitet": Location
- "Busksteppet / Halvørken": shrub-steppe, semi-Desert
- "Acacia-Commiphora krat": Acacia-Commiphora bushland
- "Rift Valley vegetation": Rift Valley vegetation
- "Tør Afromontan skov": Dry Afromontane forest
- "Fugtig Afromontan skov": Moist Afromontane forest
- "Tågeskov": Ericaceous belt
- "Afroalpin zone": Afro-Alpine zone
- "Flod, sumpe": River, swamps
- "Saltsumpe": Salt marshes

Illustrations on p. 14: Three types of vegetation between Ginir and Imi. Left *Acacia-Commiphora* bushland with *Commiphora myrrah* (Burseraceae) in the foreground. It has slightly succulent leaves, which can resist drought. In the middle semi-desert and shrub steppe, where the ground between the bushes are covered by annual grasses and herbs, especially *Aizoon canariense* (Aizoaceae). To the right: a low, open vegetation of salt tolerant shrubs, especially *Suaeda monoica* (Chenopodiaceae), which is common along the Webe Shebele River near Imi.

Illustrations on p. 15: Three rare plants, all adapted to the dry and sunny climate between Gin and Imi. Left: *Momordica sessilifolia* (Cucurbitaceae), which stores water and nutrients in large tubers half buried in the ground. In the middle: *Limonium distichum* (Plumbaginaceae), a small subshrub with cylindrical, succulent leaves. To the right: *Reseda oligomerooides* (Resedaceae), which has extremely narrow and slender leaves. These three species, and a range of others from the same area, have their main distribution in Somalia.

Illustration on p. 16: Odile Weber collecting flowering specimens of *Pyrenacantha malvifolia* (Icacinaeae). Note the large tubers sitting half buried in the ground and

the liana-like branches, which flower during the dry season, when the plants are leafless.

Illustration on p. 17: A tree-spurge, *Euphorbia robecchii* (Euphorbiaceae), with woody, candelabra-shaped growth-form and hanging slender branches with flowering shoots. This peculiar growth form during flowering has not previously been described.