Dr. Michael Möller, Dipl.-Ing.(FH), MSc, PhD
Royal Botanic Garden Edinburgh (RBGE)
20A Inverleith Row
Edinburgh EH3 5LR
Scotland UK

Edinburgh, 06 June 1997

***Madagascar Expedition from April 12, 1997 to May 19, 1997, under the research accord between the Parc Botanique et Zoologique de Tsimbazaza (PBZT) and the Royal Botanic Gardens Kew (RBGK).***

## Preliminary Research Report:

## Regions observed:

| | | |
|---|---|---|
| 1. National Reserve No XI, Andohahela, | 19.04. - 24.04. | 6 days |
| 2. Forest of Col de Manangotry, Fort Dauphin area | 25.04. - 27.04. | 3 days |
| 3. Mount Beampingaratra, Fort Dauphin area | 30.04. - 05.05. | 6 days |
| 4. Mount Iaranandriana, National Road No. 7, PK36 - 40 | 10.05. | 1 day |
| 5. Mount Ibity, ~180km south of Antananarivo | 11.05. | 1 day |
| 6. Angavo, near Ankazobe, ~100km north of Antananarivo | 15.05. | 1 day |

## Result:

29 taxa collected as herbarium material
12 taxa preserved in alcohol (flower buds and/or flowers)
28 taxa sampled as leaf material dried in silica gel
19 taxa collected as living plants (seedlings, whole plants, or cuttings)
17 taxa collected as seeds

## Notes on individual collection trips:

**1. Reserve National No XI, Andohahela** (~30km north-west of Fort Dauphin)

Parcelle I consists mainly of undisturbed evergreen rain forest, ranging from ~200 to ~580m observed area. Two *Streptocarpus* species could be found, from altitudes of around ~240m all along the path and over the Col de Tanatana, either as epiphyte (*S. muscosus*: MM 9703, MM 9705), on tree trunks, fallen logs or as small herb on rocks growing amongst moss near streams with frequent water supply (*S. levis*: (MM 9702, MM 9704, MM 9707). The forest around Col de Tanatana is largely undisturbed on the eastern side, whereas on the western side it is disturbed under ~450m altitude.

The forest along the path following the Andranohela river is of a drier type, and disturbed by human activities (e.g. collection of firewood, agriculture) up to altitudes of ~340m, where a west to east flowing river joins the Andranohela. The same *Streptocarpus* species occurring along the path to the Col de Tanatana could be found here. Additionally two other species (*S. tanala*: MM 9710; *S. venosus* 1911) were collected. The former occurred at very wet locations in small groups of 5-20 plants (~500 plants in total), whereas the latter occurred in masses all along the river, and the river Andranohela up to ~500m altitude (observed area) at drier locations on slopes, alongside several *Impatiens* species and diverse genera of Acanthaceae.

**2. Forest of Col de Manangotry** (~30km north of Fort Dauphin)

The forest is of an evergreen cloud forest type, largely undisturbed above ~270m altitude. Specimens of *Streptocarpus* could be found in abundance, and some *S. venosus*. *Streptocarpus muscosus* also occurred on steep slopes along the path over the Col de Manangotry (even in areas recently disturbed by road works). The previously described locations for *S. beampingaratrensis* cf. var. *brevicarpus* could not be verified. Closer examinations of the herbarium specimen (No. 3864) revealed several differences to the description of the type specimen, suggesting its own species status (further examinations on other collections are needed !).

**3. Mount Beampingaratra** (~100km north-west of Fort Dauphin)

The forest along the path from Ranomafana to the Col de Beampingaratra begins at altitudes of ~300m and is largely disturbed by logging and agricultural activities up to ~400m. Above this altitude it is largely intact and of a high species diversity except for certain areas where cattle widened the path (up to 20m) and destroyed heavily the undergrowth. Although visiting the area in the drier winter, this year was particular dry, and a high number of small herbs (e.g. diverse *Impatiens*, Acanthaceae, even some *Peperomia* species) were found in a very desiccated state, some beyond the permanent wilting point (PWP). *Streptocarpus* could be found from altitudes of ~250m onwards (*S. levis*) and the rosulate *S. beampingaratrensis* (MM 9715) was found at >430m in small groups (5-50 plants) on drier rocks, some distance (~50m) away from streams in deep shade on vertical rocks. A species superficially resembling *S. beampingaratrensis* subsp. *antambolorum* (MM 9719) was found at two locations only at ~550m (~400 plants) and ~700m (50 plants) on wetter vertical cliffs in deep shade. Although Hilliard and Burtt (1971), working on herbarium specimen only, mention that Humbert noted that it is possible to distinguish within a restricted area several subspecies or varieties of S. beampingaratrensis growing in little homogeneous colonies, sometimes only at a short distance from one another, the only two types of *S. beampingaratrensis* found (in very few colony numbers) during this expedition showed now close affinities such as to indicate subspecies relationship, but rather independent species status. With the introduction into cultivation of living material at the Royal Botanic Garden Edinburgh there is now the opportunity to investigate relationships between these specimens, using morphological cytological and molecular data, to solve this matter of uncertain taxonomy.

*Streptocarpus andohahelensis* (MM 9717) was found at altitudes between ~500-800m at a few locations only but in large number. None of these rosulate species seemed to be directly affected by the dry condition, as they grew (or just there survived?) hidden from direct sunshine in very deep shade, at places where some moisture was still preserved.

One kilometre before the Col de Beampingaratra *S. papangae* (MM 9718) was found (in small numbers of only 20 plants in total), growing on steep slopes amongst other shrubs.

**4. Mount Iaranandriana, National Road No. 7** (~40km south of Antananarivo)

Mount Iaranandriana is a chain of rocky hills, stretching over 5 km (from North to South) along the National Road from Antananarivo to Antsirabe, with meadows and small shrubs dominating the vegetation. The observed area stretched between PK36 and PK40, 36 to 40 km south of Antananarivo. *Streptocarpus perrieri*, collected here in 1966, could not be found. Instead, a species (MM 9720) closely resembling *S. thompsonii* was collected at one location (~1650m) in large number on a recently (relatively, in evolutionary terms) build dry stone wall surrounding agricultural areas.

**5. Mount Ibity** (~180km south of Antananarivo)

Mount Ibity is another mountain chain, 170 km south of Antananarivo of several, ~2200m high mountains, devoid of forests with a surprisingly diverse vegetation above ~1650m, of small shrubs, several species of *Aloe*, *Crassula*, *Kalanchoe*, many orchids and a *Pachypodium* species in large number. Lower areas were affected by agricultural activities, mainly cattle grazing and the practise of burning the slopes in winter months (similarly at Mount Iaranandriana). The northern slope, reaching a plateau at ~1800m was observed for *Streptocarpus*. At ~1700m and higher *S. ibityensis* could be found in large number (5-200 individuals) under almost every larger rock, in dry to semi-dry environments, growing in sandy humus soils or on bare rock in minimal substrate. Three populations of *S. itremensis* were located in the same area, growing in humus in deep moist rock crevices in deep shade mostly growing in vertical positions with constant sufficient water supply! Beside these two species *S. thompsonii* (MM 9724) was observed occurring in small number at only two locations, with a total number of ~20 plants.

**6. Angavo, near Ankazobe** (~100km north of Antananarivo)

South-west of Angavo the mountain reach a total altitude of 1576m. In its centre is a steep, almost vertical cliff with numerous ridges. Several deep vertical crevices with dense shrubby vegetation are distributed across the eastern side, with small streams feeding paddy rice fields

at the foot of the mountains. In the crevice right to the cliff, along a small stream *S. perrieri* and other unifoliate types (variable *S. perrieri*?) were found growing amongst moss in deep shade horizontally or vertically (population size: ~100 plants). A large proportion of plants (~50 plants) were found in a completely desiccated state amongst dried moss, but with numerous ripe fruits containing fully developed seeds (seed bank?).

## Résumé:

In total 19 accessions of *Streptocarpus* were collected (plus *S. hildebrandtii* in cultivation at the Parc de Botanique et Zoologique de Tsimbazaza) found growing in five very distinct climatic environments, from wet locations on rocks amongst moss in rivers (National Reserve Andohahela), to dry sandy conditions on hill tops (Mount Ibity). Three different growth forms of this genus (unifoliate, rosulate, caulescent) and a woody shrub (*S. papangae*) could be sampled and examined, comprising almost all growth forms of *Streptocarpus* occurring in Madagascar.

The distribution of certain *Streptocarpus* species and the size of those populations was found to be correlated with the state of the evergreen rain forest in the south, in the National Reserve of Andohahela and the Mount Beampingaratra along the Maloto river, and indicates the necessity of an undisturbed ecological system for the sustainable presence of certain *Streptocarpus* species. This sensitivity of *Streptocarpus* also indicates a potential of this plant as an ecological indicator plant for largely intact rain forest systems.

Some *Streptocarpus* species sampled at the same locations decades ago appeared to have experienced a genetic shift, because they differ significantly morphologically, e.g. in leaf shape (*S. beampingaratrensis* subsp. *antambolorum* collected by H. Humbert in 1928 show oval leaves, whereas plants collected during the present expedition had round leaves!). It is possible though, that the colonies found are the last surviving ones of this species, as, as

already mentioned before, Humbert found morphologically varying colonies. Although not an excessive area was covered during the present expedition, the closer vicinity (ca. 200m) of each colony was observed for further colonies. In the case of *S. beampingaratrensis* subsp. *antambolorum*, however, only two isolated colonies were found, but ~5km apart (~150m difference in altitude) consisting of plants with round leaves for both colonies.

Other species were found at new locations (e.g. *S. tanala*, MM 9710; *S. thompsonii* MM 9720, MM 9724).

Some populations seem to have disappeared completely (e.g. *S. perrieri* on Mount Iaranandriana, National Road No. 7). The low plant number of certain species and localities (e.g. *S. itremensis*, MM 9723; *S. perrieri*, MM 9726) may indicate the need for conservation or re-introduction measures to encourage plant recovery to a genetically sustainable level. to address these point in a scientific sound manner, a with view to the limited scope the present expedition allowed, a thorough re-examination of localities and general distribution of *Streptocarpus* in Madagascar is desirable.