

**A Field Guide**  
**to the Bushcrickets, Wetas and**  
**Raspy Crickets of Tanzania and Kenya**



**Claudia Hemp**

**SENCKENBERG**



A Field Guide to the  
Bushcrickets, Wetas and Raspy Crickets  
of Tanzania and Kenya

Claudia Hemp  
with contributions from Andreas Hemp and Klaus-Gerhard Heller

Senckenberg Gesellschaft für Naturforschung

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## Foreword

The Orthoptera are a relatively small group of insects, most diverse in the Tropics. Many people, having locusts in mind, think of Orthoptera as harmful insects that damage the crops of arid and semi-arid Africa. This, however, is a gross over-simplification. Many Orthoptera, especially the so-called bushcrickets, inhabit a great diversity of habitats and have developed wonderful adaptations of their body shape and colouration. For example, some change their form dramatically as they grow from larvae to adults. They may closely resemble an ant when they hatch (genus *Eurycorypha*), or mimic a poisonous beetle (genus *Plangia*), but later develop into a well-camouflaged adult. The majority of bushcrickets rely on camouflage and are thus rather inconspicuous. They are also perfect bioindicators, reflecting the habitat quality of e.g. forests. Forests, alas, are disappearing at an alarming rate in the tropics and with them their unique flora and fauna, including their marvelous bushcrickets. My own love for Orthoptera started when I was still a teenager. I observed grasshoppers, then of the genus *Chorthippus*, common inhabitants of grasslands in Upper Frankonia, Germany, where their various songs are the embodiment of summer. Later I had the chance to start to study Orthoptera in Africa, first on Kilimanjaro, where my husband and I arrived in October 1989, as students of the University of Bayreuth. We were catapulted into a totally new world of plants and insects. Conducting our ethnobotanical and zoological research laid the foundation of our knowledge of the plants and insects of East Africa.

My main interest was and is to illuminate mechanisms of speciation, but I soon found that in most areas of East Africa there is a wealth of undescribed species. Many of these newly detected species were bushcrickets (the Tettigonioidae), and most of them were restricted to single mountains or mountain ranges in the area. On the one hand, this situation represented a perfect opportunity to study speciation processes, on the other hand, it entailed a huge task in identifying, characterizing, and describing species new to science. Comparing my collected material with museum specimens in various entomological collections in Europe (immeasurable treasures of insects of the world!) – it soon became clear that much work remained to be done. Many species – even if not actually new to science – were known from only a few individuals, often only from the holotypes. Further, almost no information on these species was available except for their descriptions (apart from the work of some pioneers of tropical orthopterology such as David Ragge, producing revisions of small groups of bushcrickets, and describing

numerous new species from the collections). The specimen labels often indicated only that individuals came from „German“ or „British“ East Africa, without providing more precise localities. Further, no photos of the beautiful living individuals were available for almost any bushcricket species, nor information on their nymphal stages. Together with my husband Andi, I felt an obligation to obtain more information on their habitat, and with Klaus-Gerhard Heller to study their often fascinating bioacoustics. With several colleagues (Wolfgang Wägele, Siegfried Kehl, Stefan Kuchler, Beata Grzywacz, Elzbieta Warchalowska-Sliwa) we also did cytogenetical and molecular work reconstructing their relationships. In parallel, I tried to photograph living individuals and to compile all available information on this poorly investigated group. The result is this book – though it probably still gives only a poor picture of the true biodiversity of bushcrickets of eastern Africa. A fully illustrated book showing living species and giving information on their habitat and biology is especially important to raise interest in a wider public, to whom I hope to show how special and beautiful many of these species are. I also hope that this book will contribute to their conservation since many of them – even though just newly described – are on the brink of extinction.

October 2020, Claudia Hemp

Photo opposite page: Tour into the Masai Steppe near Mt Lossogonoi in December 2014. From left to right: field assistants Elibariki Mmary and Erick Materu, Julian and Claudia Hemp, a Masai guest (Photo credit: Andreas Hemp).

## Introduction

### Bushcrickets, Wetas and Raspy Crickets of Tanzania and Kenya

#### Systematics

**Bushcrickets** (Great Britain) or **katydids** (North America, Australia and New Zealand) treated in this guide belong to the insect order Orthoptera, and here to the suborder Ensifera. Bushcrickets are distinguished from other groups of Orthoptera such as crickets (Grylloidea) and grasshoppers & allies (Caelifera) by the long antennae (of body length or longer) and a mostly conspicuous ovipositor of the females. Bushcrickets have long or reduced but hardened fore wings and are thus easily distinguished from Raspy Crickets (Gryllacrididae) with which they may be confused.

**Wetas** or **King Crickets** of East Africa belong to the family Anostomatidae. East African taxa belong to the subfamilies Anostomatinae (*Nasidius*) and Lutosinae (*Libanasa*). However, the systematic position is not solved yet and it seems possible that a new genus and subfamily could be erected for Tanzanian species listed in the Lutosinae as *Libanasa* (Johns & Hemp 2015). Another two genera with each one species are recorded for the area, *Henicus cephalotes* (Tanzania?: Anchieta) and *Nasidius pulchriiventris* from the Ufipa plateau of Tanzania. Probably a new species of *Nasidius* occurs in the East Usambara to Uluguru Mountains.

**Raspy Crickets** (Gryllacridinae) are poorly collected and investigated in East Africa. There are large and fully winged species such as *Afroepacra* and *Stictogryllacris* but also small and fragile wingless species e.g. in the genera *Ametroides* or *Glomeremus*.

#### Ensifera / Tettigoniidea

#### Tettigoniidea, Family Tettigoniidae

#### Bushcrickets

- Subfamily Conocephalinae Burmeister, 1838
- Subfamily Hetrodinae Brunner von Wattenwyl, 1878
- Subfamily Hexacentrinae Karny, 1925
- Subfamily Meconematinae Burmeister, 1838
- Subfamily Mecopodinae Walker, 1871
- Subfamily Phaneropterinae Burmeister, 1838
- Subfamily Pseudophyllinae Burmeister, 1838
- Subfamily Saginae Brunner von Wattenwyl, 1878

#### Superfamily Stenopelmatoidea

#### Wetas or King Crickets (Anostomatidae)

- Genus *Libanasa* Libanasas
- Genus *Nasidius* Big Faces

#### Raspy Crickets

- (Gryllacrididae)
- Genus *Afroepacra* Afroepacras
- Genus *Afroneanias* Afroneanias
- Genus *Ametroides* Flightless Raspy Crickets
- Genus *Atychogryllacris* Short-winged Raspy Crickets
- Genus *Glomeremus* Flightless Raspy Crickets
- Genus *Stictogryllacris* Raspy Crickets

#### Insect Anatomy

In **Insects** or **Hexapoda** (**-hexa** means six and **-poda** feet, because of the six legs differentiating them from e.g. spiders and crustaceans which have more legs) the body is divided into three main parts: head, thorax (middle part) and abdomen (rear part consisting of usually 10 segments in bushcrickets & allies) (Fig. Intro 1). Males often have complicated external genitalia, useful characters to distinguish bushcrickets & allies on genus and species level (Fig. Intro 2). Females usually have a well-developed ovipositor (Fig. Intro 1) used to deposit eggs into the soil, place them between tissue layers of leaves, cut slits into stems of plants, place eggs under bark or glue them to the surface of leaves or branches. In some genera, the ovipositor can be greatly reduced e.g. in the genus *Catoptropteryx*. The head carries eyes, antennae and the mouthparts (Fig. Intro 3) while the thorax carries two pairs of wings (the hard fore wings or tegmina and the soft hind wings or alae which enables the insect to fly (Fig. Intro 4)), and three pairs of legs. The venation of the fore wings is characteristic, especially the course of subcosta and radius and their branches are stable at the genus level. The fastigium verticis (Fig. Intro 5, arrow) is an important character on genus level. It can be very broad (e.g. *Eurycorypha*) to narrow or forming a short to long conical structure (all Agraeciini). The forelegs carry the ears which can be open (Fig. Intro 7) or closed (conchate, Fig. Intro 8). The fore tibiae can be slightly or strongly inflated in this area and differently colored from the rest of the leg in various species. The hind legs are usually longer and thick at their bases enabling the insect to jump.

## Bioacoustics

by Klaus-Gerhard Heller

Most bushcrickets produce calling songs that vary from very loud to faint, are monotonous or consist of different parts recognizable to the human ear. Some can be heard only by using a “bat detector” to modulate their ultrasonic sounds. The stridulatory apparatus (dorsal view, Fig. Intro 6, arrows) is located on the fore wing bases consisting of a stridulatory file (few to many sclerotized tiny teeth, Fig. Intro 9) on the left fore wing and a scraper on the right fore wing. The left fore wing with its stridulatory file moves over the scraper of the right fore wing. The typical male calling sound then is produced with the opening or closing movement of the tegmina. A so-called mirror (Fig. Intro 10, arrow) is often used to amplify the sound.

In the subfamily Phaneropterinae, most females answer to the male calling songs with their own acoustic signals. The male calling songs, ranging from very simple to extremely complex, are far more variable in Phaneropterinae than in other tettigoniid groups. Pseudophyllinae are not easily perceived in East Africa since the male calling songs resemble cricket sounds and are often not very loud (e.g. in *Acauloplax exigua*). In the subfamily Mecopodinae male calling songs can be extremely loud and heard at distances of hundreds of meters (*Anoedopoda*) or may be entirely ultrasonic (e.g. *Gymnoscirtes*). Conocephalinae usually have monotonous songs which are partly in the ultrasonic range and thus audible only very faintly if at all with the unaided ear (e.g. *Conocephalus*, all Karniellina). *Ruspolia* species usually sing at night and the songs of some of the species can be very loud and heard from a far distance (e.g. *Ruspolia differens*). Audible songs are also found in the tribe Agraeciini of Conocephalinae. Some *Afroanthracites* species (in the West Usambara Mountains) produce male calling songs clearly perceivable while most *Afroanthracites* and all *Afroagraecia* species sing in the ultrasonic range. Meconematinae calling songs are all in the

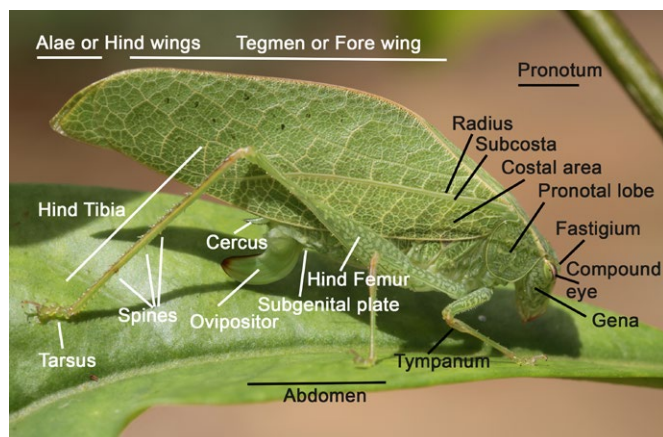


Fig. Intro 1. Body parts: female *Eurycorypha combretoides*.

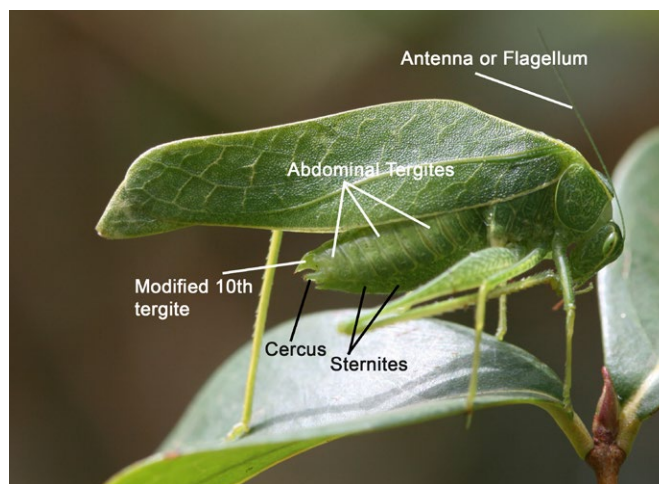


Fig. Intro 2. Body parts: Male *Eurycorypha meruensis*.

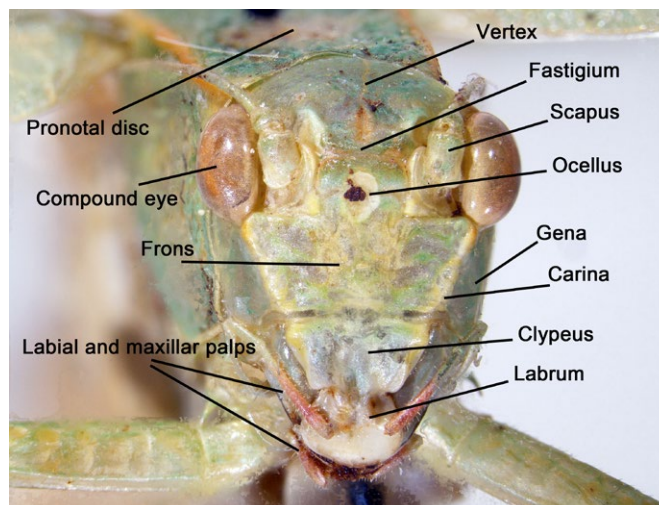
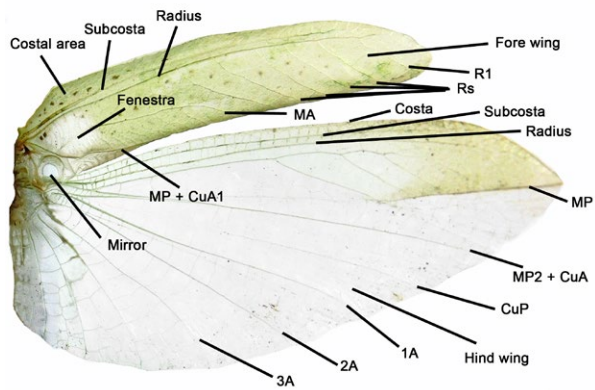


Fig. Intro 3. Body parts: Face of *Eurycorypha combretoides*.

ultrasonic range as far as they have been recorded in East Africa. Ever present at night is the monotonous male calling song of *Amytta* species. The male calling songs of Hetrodinae species are perceived with the unaided ear and consist of faint (e.g. *Spalacomimus talpa*) to loud (e.g. *Eugasteroides loricatus*) monotonous syllables produced at night. Hexacentrinae songs are very loud and produced by the males at night. Where *Aerotegmina* occurs the whole forest may be filled with the loud chirping sounds starting immediately after sunset. The *Aerotegmina* species of northern Tanzania and southern Kenya produce one of the loudest songs known in bushcrickets.

## Introduction



**Fig. Intro 4.** Veins of fore wing (tegmen) and hind wing (ala).



**Fig. Intro 7.** Open ear or tympanum on fore tibia.



**Fig. Intro 5.** The fastigium verticis is an important character to identify many groups. The arrow points to the conical fastigium verticis of *Afroagraecia brachyptera*.



**Fig. Intro 8.** Conchate (closed) tympanum (arrow) (*Spalacomimus verruciferus*).



**Fig. Intro 6. A.** Stridulatory area on left fore wing (arrow) (*Debrona cervina*).



**B.** Enlarged image of stridulatory file from dorsal side of left tegmen of *Debrona cervina*.



**Fig. Intro 9.** Stridulatory file on the underside of the left tegmen (*Lunidia acuticercata*).



**Fig. Intro 10.** Mirror (arrow) for amplifying sound (*Aerotegmina kilimandjarica*).

## History of Orthoptera Research in East Africa

First intensive collections giving an overview of the Orthoptera fauna of Mt Kilimanjaro and adjacent areas were made by a Swedish Expedition beginning of the last century (Sjöstedt 1910) recording 34 Tettigonioidae and 71 Acridomorpha species for the whole mountain massif, including Mt Meru and parts of the Usambara and Pare Mountains. Sjöstedt also compiled lists of Orthoptera collected on various expeditions (1912; 1918) and described numerous African taxa, especially in Caelifera. An early collector also describing species and providing faunal lists in the area was Gerstäcker (1869). Redtenbacher (1891), Rehn (1901; 1914), Karny, Karsch, Brunner v. Wat-

tenwyl, Beier, Weidner, and Kaltenbach all contributed greatly to the knowledge of the Tettigonioidae diversity of eastern Africa, working mainly on museum material. Brunner von Wattenwyl compiled major lists of Phaneropterinae and Pseudophyllinae, describing taxa and also providing keys (1878; 1891; 1895) and also F. Karsch compiled faunal lists and described numerous taxa from Africa (1887 a, b; 1888 a–e; 1890; 1892; 1896; 1898) with a special focus on Mecopodinae, Meconematinae, and Phaneropterinae. H. Karny mainly worked on Conocephalinae (1907; 1909; 1912 a, b), and Listroscolidinae (1912 c) and compiled faunal lists of expeditions led to various areas of Africa (e.g. 1907; 1915; 1929). M. Beier focused on Pseudophyllinae and Meconematinae (e.g. 1944; 1954; 1965; 1967) while Weidner revised African Hetrodinae (1941; 1955). Kaltenbach (1970, 1972) provided valuable papers on African Saginae while Chopard provided faunal lists (1921; 1932; 1936; 1938; 1943; 1945) and described taxa, mainly in Phaneropterinae (e.g. 1954; Chopard & Kevan 1954).

Focusing on African bushcrickets the British orthopterologist David Ragge contributed greatly to the knowledge of this group, revising and describing numerous genera and species (1956 a, b; 1960 a, b; 1961 a, b; 1962 a, b; 1964; 1969) and published a comprehensive list of Phaneropteridae with open tympana in 1980 also describing various new genera and species and providing keys. Revisions of single genera also giving keys to the species were made by e.g. Huxley (1970) (*Catoptropteryx*), Bailey (1975) (*Ruspolia*), and Glenn (1991) (*Enyal-iopsis*).

Hemp (2013 a) published an annotated list of Tettigonioidae recording 57 Tettigoniidae and 6 Gryllacridinae species for Mt Kilimanjaro and additional species were listed for this mountain and a list provided for the East Usambara Mountains and additional species described for East Africa (Hemp 2013 b). Numerous new taxa were described, genera revised and studies on the ecology, acoustics, chromosomes and molecular phylogenies prepared from 2001 onwards (Heller & Hemp 2014; 2017; 2018; Hemp & Heller 2017 a, b; 2019 a, b; Heller et al. 2010; 2014; 2015; 2017; Hemp 2001a–c; 2002a, b; 2005 a, b; 2006 a, b; 2007; 2009; 2010; 2011; 2013 a–c; 2015; 2016; 2017 a–d; 2020 a, b; Hemp et al. 2009; 2010 a–d; 2012; 2013 a, b; 2014; 2015 a–c; 2016 a, b; 2017 a–c; 2018 a, b; 2019; Hemp & Hemp 2003; 2008; 2018; 2011; 2018; Voje et al. 2009; Warchalowska-Sliva et al. 2015; Grzywacz et al. 2015) focusing on the Phaneropterinae genera *Eurycorypha*, *Plangia*, *Ectomoptera*, *Dioncomena*, *Lunidia*, *Monticolaria*, *Parapyrrhicia*, *Gonatoxia*, *Odonturooides*, and *Tropidonotacris*, the East African Acrometopini, the East African Agraeciini (Conocephalinae), African Hetrodinae, the Mecopodinae genus *Philoscirtus*, the Hexacentrinae genus *Aerotegmina* and the Meconematinae genera *Amytta*, *Afrophis* and *Phlugidia*. Two papers were published on the genus *Libanasa* trying to clarify their taxonomic status within Anostostomatidae and describing a new species (Johns & Hemp 2015; Hemp & Johns 2015). New genera were erected on taxa from the rapidly vanishing lowland wet forests, *Pseudotomias* in Pseudophyllinae and *Pseudopreussia*, and *Materuana* in Phaneropterinae.

### Biodiversity, Bioindication, and Conservation

Bushcrickets, grasshoppers, and allies are often perceived only as being pests although only a handful of species are recorded occasionally causing damage to crops. The majority of bushcricket species & allies are inconspicuous and are rarely seen as they resemble leaves and are thus perfectly camouflaged in the vegetation.

This guide is an attempt to provide an overview of the **Bushcricket, Weta, and Raspy Cricket** fauna of parts of Tanzania and Kenya, highlighting the enormous diversity of these interesting groups of insects. Many species are endemic to the area, meaning that some of the species are only found in a very restricted area, mostly confined to single mountains or mountain ranges. Many species are dependent on forest habitats and are thus endangered by clearing or burning of forested areas and encroachment by human settlement.

Therefore, when treating species restricted to an area or being endemic to mountains and mountain ranges the conservation status following the nomenclature of the IUCN red list is suggested.

Thus species are vulnerable, endangered, or critically endangered depending e.g. on how many populations are known and how fast the habitats which the species require are vanishing in East Africa.

Various bushcricket species are excellent bioindicators because many species have narrow ecological niches in which they can live and thus define their habitats very precisely. Thus the presence/absence of certain species in an area quickly provides information about the quality of a given forest for example. A rapidly increasing human population impacts pristine forest habitats of East Africa by cutting, burning, and using also steepest slopes as rangeland for life stock these days. For example, the vegetation type “Obstgartensteppe” is almost lost on Mt Kilimanjaro. The presence of species such as the **Great Ridgeback** (*Tropidonotacris grandis*) indicates dry deciduous forest or the habitat type “Obstgartensteppe”(orchard steppe) that are vanishing rapidly in East Africa. Coastal and lowland forests, once a contiguous belt along the Kenyan and Tanzanian coasts and lowland wet forests at the foothills of mountain ranges and mountains are almost entirely cleared away today, only a few patches, mostly more or less protected forest reserves, are left. With them, a unique flora and fauna disappear replaced by scrub and grassland harboring at the most widespread species (Gereau et al. 2016).



Fig. Intro 11. Map of East Africa with mountains and mountain ranges indicated.

### Area covered in this guide

The range of this guide covers northern Tanzania and southern to central Kenya, coastal Tanzania, and many species of central Tanzania (Map, Fig. Intro 11). Genera restricted to East Africa are covered by keys to all known species e.g. the Karniellina genera *Phlesirtes* and *Fulvoscirtes*.

## Climate and Vegetation

by Andreas Hemp

(adapted from Jago's Grasshoppers of East and North East Africa Vol 1 (2015) (Ed. Rowell, Hemp C. & Harvey)

### Climate

The climate of East Africa is characterized by a typical equatorial daytime climate that is modified by elevation and exposure. Average diurnal ranges of temperature (5–8°C at the coast, 8–11°C inland) are higher than the mean annual range of 4°C. Although East Africa lies in the tropics, very high daytime temperatures are reached only in limited areas because most of the plateau lands lie at over 1000 m. Temperatures of 40°C are very rare and occur normally only in the Rift Valley. Mean annual temperature decreases from 27°C at the coastal belt near sea level and the coastal islands to -7.1°C at 5895 m on Kilimanjaro summit with a lapse rate of about 0.5–0.7°C per 100 m. In particular, the climate of the alpine regions of East Africa is characterized by a very pronounced day-time climate with a massive diurnal variation. This was described by Hedberg (1964) as 'summer every day and winter every night'. Frost can occur during clear nights throughout the year at elevations above 2700 m and snow can cover the vegetation above about 3800 m for days at a time. The rainfall of East Africa depends mainly on the prevailing winds, which are governed by the seasonal movement of the intertropical convergence zone (ITCZ) but rainfall is also influenced by sea surface temperature dynamics. The ITCZ, a broad, low-pressure zone where the subtropical NE and SE trade winds meet resulting in convectional rainfall follows the sun's movements with about one month's lag. In East Africa, the SE trade winds dominate from May to October, while the NE trade winds dominate from November to April. Sea surface temperature dynamics, mainly in the Pacific (ENSO) and Indian Ocean (Indian Ocean Dipole, IOD) also influence the climate of East Africa. In addition, the large lakes of East Africa and the varied topography also modify wind flow and rain distribution in the highlands. The wet seasons are associated with the period of change in direction of the prevailing wind. Two rainy seasons are discernable near the equator between 3–4° N and S latitude (Rwanda, Uganda, Kenya, Tanzania), the "short rains" from November to December and the "long rains" from March to May, while there is only one rainy season further N and S. In northern Kenya and Uganda the main rainy season continues from April to August, in Ethiopia from April to September, while in central and southern Tanzania the rains begin from November onwards continuing into April, followed by a well-marked dry season. East Africa is anomalously dry. About 66% of East Africa suffers from drought for six months of the year, while only 2% of the area has a reliable rainfall of >50 mm every month, and e.g. only some 4% of Tanzania has >1250 mm of rainfall annually. Only 15% of Kenya

receives a reliable 750 mm per year, adequate for crop production, compared with 50% of Tanzania and 75% of Uganda (Glover et al. 1954). Generally, the mountains stand out as wet areas and they are usually wetter on their south-eastern faces. However, only a few mountain areas have perhumid climate conditions, receiving more than 2500 mm, e.g. Kilimanjaro, or Ruwenzori. Generally, East African mountains have dry foothills where the maximum rainfall occurs somewhere below 2500 m, depending on the elevation at which the wet monsoon interacts with the dry trade winds. For example, the mean annual precipitation at the foothills of the southern slopes of Kilimanjaro is 500–600 mm, at 2200 m it is partly more than 3000 mm, at 3000 m (approximating the upper forest boundary) it is 1350 mm and at 4000 m it declines to 600 mm. Except for such humid mountains, most areas of East Africa belong to the zone of a seasonal dry tropical climate. Conditions inland from the coast up to the Eastern Rift highlands are semi-arid. The driest areas are the semi-deserts of North Kenya around Lake Turkana and Somalia receiving an unreliable average under 250 mm per year, which are due to the high temperatures and the corresponding high evaporation. Only the "alpine deserts" of Kilimanjaro above 4500 m a.s.l. receive a similar low precipitation, but have a humid climate regime due to the much lower temperatures and evaporation. Thus, East Africa comprises areas along a huge climatic gradient ranging from warm tropical lowland to cold afroalpine temperature regimes and from arid to perhumid conditions.

### Vegetation Coastal vegetation

The vegetation of the sea coast is confined to a narrow strip of 5–10 km with an annual rainfall of about 1000–1400 mm. Sand dunes, coastal bushland and forest, coastal savanna, and mangrove swamps are a feature of some parts of the coastline of Somalia, Kenya, and Tanzania. However, this area has been densely settled for many centuries and therefore is mostly occupied by commercial plantations of coconut palms and sisal, smallholders' fields with Manihot and maize and degraded overgrazed grasslands. An interesting array of typical East African coastline vegetation can be still seen in the Sadaani National Park between Pangani and Dar es Salaam in Tanzania: sand dunes with the long-creeping (and pan-tropical) *Ipomoea pes-caprae* (Convolvulaceae), salt marshes with the fern *Acrostichum aureum* and coastal savanna with *Borassus* and *Hyphaene* palms. A very typical feature of (sub)tropical coastlines are mangrove forests, which grow between high and low tide levels in sheltered situations in estuaries and on exposed coast protected by coral reefs or islands. The most extensive and species-rich mangrove forests occur round the mouth of Rufiji and Pangani River in Tanzania, and around Lamu in North Kenya. Mangrove shows a very distinct zonation of the dominant trees with *Sonneratia* on the open coast, followed by *Rhizophora*,

## Climate and Vegetation

*Cerriops* and *Avicennia*. This zonation is caused mainly by water level and salinity.

Coastal bushland and scrub forest on fossil coral reef limestone (“coral rag”) with *Pandanus*, *Pemphis*, *Sideroxylon inerme*, and *Surregada zanzibarensis* fringes the sand dunes and mangroves on the Tanzanian and Kenyan coast. Coastal vegetation is generally poor in specially adapted Orthoptera. No specially-adapted Orthoptera have been recorded so far from mangrove habitats.

### Savanna

Stretching inland from the coast, savanna vegetation (grassland with a more or less dense shrub and tree layer) covers large areas of East Africa (two-thirds of Kenya) at low to medium elevations (50–1400 m) and 250–900 mm precipitation. This vegetation formation typical of Africa was shaped by the long-lasting influence of humans (pastoralism, fire) and wild herbivores. The semi-desert vegetation of the driest areas of northern Kenya and Somalia, receiving only about 250 mm erratic and unreliable rainfall, consists of isolated tufts of grass (*Aristida*) and occasional low, partly thorny bushes (*Commiphora*, *Acacia*, *Sericomopsis*).

With increasing precipitation further south vegetation cover becomes denser. With an (erratic and unreliable) rainfall of 500–700 mm a year savanna grasslands dominated by acacias (*A. tortilis*, *A. seyal*, *A. nilotica*, *A. senegal*, *A. hockii*, *A. mellifera*) have their greatest development in a broad belt, which encircles Kenya’s highlands, extending north to Somalia and south to northern Tanzania (Serengeti, Ngorongoro, Masai steppe). After the rainy season, the ground is more or less covered (depending on the cover of shrubs and trees) by grasses (*Pennisetum*, *Hyparrhenia*, *Andropogon*, *Heteropogon contortus*, *Themeda triandra*, *Eragrostis*), sedges (*Cyperus niveus*, *C. amomodoris*) and bulbous lilies (*Hypoxis*, *Crinum*, *Chlorophytum*, *Gladiolus*). On frequently waterlogged black cotton soil the gall acacias (*A. drepanolobium* and *A. seyal* var. *fistulosa*) are common. An increase in rainfall

favors wooded savanna grasslands in Kenya, Uganda, Rwanda, and Tanzania dominated by deciduous trees and bushes such as *Commiphora*, *Terminalia*, *Boscia*, *Lankea*, *Ozoroa*, *Sclerocarya* and *Grewia*, as well as *Acacia* spp. The fruit tree-like appearance of the stunted woody species – mainly belonging to Combretaceae, Burseraceae and Anacardiaceae – inspired the first botanists to describe this vegetation formation as “Obstgartensteppe” (orchard-steppe). In these areas, the presence or absence of elephants is often the deciding factor between forest or grassland.

In damp areas (in particular on the coast) the dichotomously branched Doum palm (*Hyphaene coriacea*) grows partly together with the African fan palm (*Borassus aethiopicum*) and here and there Baobab (*Adansonia digitata*). Around the shores of the lakes in the Rift valley, the fever tree *Acacia xanthophloea* forms distinct monotypic woodlands. On steep slopes and rocky habitats, large succulents such as *Euphorbia obovata*, *quinquecostata* or *candelabrum* occur. The above-described types of savanna vegetation occur in large areas of East Africa, in particular inside the national parks (e.g. Queen Elizabeth, Kidepo Valley, Lake Mburo, Tsavo, Amboseli, Serengeti). Outside of such protected areas savanna becomes more and more overgrazed and degraded or is converted into agricultural fields or plantations.

Savanna habitats belong to the most important habitats for Orthoptera. Although most species found in typical savanna are widespread, extending from the West African Sahel to the coasts of Somalia and Eritrea, some are restricted to East Africa, and also local endemics occur, mostly in the vicinity of mountains.

### Miombo woodlands

With an increasing tree height and cover these open vegetation types change into woodlands, where trees reach a height of 15 m, with the crowns just touching to form an open canopy, in contrast to forest with a deeply closed canopy. Such Miombo or *Brachystegia-Julbernardia* woodlands consists of deciduous trees such as *Brachystegia*,

**Fig. Climate 1.** Savanna woodlands around Mt Kasigau in southern Kenya.



**Fig. Climate 2.** Miombo woodland in the Mpwapwa District of central Tanzania. Miombo woodlands are vanishing rapidly in East Africa.





*Julbernardia*, *Isoberlinia*, *Afzelia*, *Terminalia*, *Lonchocarpus*, *Combretum* and *Markhamia* and have many species in common with savanna ecosystems but grade into seasonal closed dry forest. Miombo woodlands are one of the most extensive vegetation types in Africa apart from the forests of the Congo Basin covering 2.7 million km<sup>2</sup> and extending from southern Tanzania and southern Democratic Republic of Congo (DRC) in the north to the northern provinces of South Africa, and across the continent from Angola through Zambia to Malawi and Mozambique. This vegetation formation comprises about 80 % of the natural vegetation in Zambia and 50 % of Tanzania, whereas it is strikingly absent from Kenya and Uganda. Miombo woodlands extend from sea level up to 1600 m in areas of 500–1200 mm annual rainfall in central and southern Tanzania. Miombo vegetation structure and species composition is greatly influenced by fire. It has been estimated that Miombo constitutes the largest single area regularly burned in the world (1 million km<sup>2</sup> per year). Burning and cutting and conversion into agricultural fields and tobacco plantations are rapidly destroying increasing areas of Miombo woodlands.

### Aquatic vegetation

Aquatic vegetation along shallow freshwater lake shores consists of deep reed swamps, mainly of papyrus (*Cyperus papyrus*), other sedges and rushes such as *Eleocharis*, *Typha domingensis*, but also grasses (*Leersia*, *Oryza*) and ferns (*Thelypteris confluens*). Extensive papyrus swamps can be seen fringing Lake Victoria, Lake Kyoga, Lake Naivasha, or Lake Jipe at the border between Tanzania and Kenya. The saline lakes are fringed by a much narrower belt of *Cyperus laevigatus*. The floating and submersed freshwater vegetation is characterized by *Nymphaea*, *Potamogeton*, *Ceratophyllum*, *Utricularia*, and *Ottelia*. The surface of slowly moving rivers and canals, but also of sheltered bays of the major lakes can be completely covered by plants such as *Pistia* (Araceae), and water ferns such as *Salvinia* and *Azolla*, or introduced species such as water hyacinth (*Eichhornia*, Pontaderiaceae) causing grave problems in some areas. In marked contrast to the situation in the Neotropics, there are no African grasshoppers specialized on this floating vegetation. Swampy areas and moist grasslands are generally poor in Orthoptera.

## Forests

### i. Lowland forests

Due to climatic restrictions and human impact not more than 5 % of East Africa's surface is closed forest. These forest relicts are mainly confined to mountains. In the lowlands (below 800 m) only few patches of forest remain, either occurring at the base of the Eastern Arc Mountains and of the SW plateau of the Ethiopian highlands or as remnants of the former widespread coastal forest strip, or on the Congo/Ugandan border. Apart from the Eastern Arc Mountains, precipitation in the coastal region is 700–1400 mm per year with an

evaporation that exceeds rainfall for most of the year. Therefore, the coastal forests are mainly dry semi-deciduous or semi-evergreen, partly evergreen ("tropical dry forests"), growing on low hills and in riverine situations along the coast from southern Somalia down to Mozambique. Repeated fires in combination with clearance for cultivation have caused an extensive loss of forest. In Somalia, Kenya and Tanzania only about 800 km<sup>2</sup> of coastal forest remain. In Somalia remnants of these forests are found in the southern coastal plains, e.g. along the west bank of the Juba River.

In Kenya larger patches of coastal forests still exist in the area of the Shimba Hills Arabuko Sokoke National Park, and in Tanzania e.g. inside the Gendagenda Forest Reserve and in Kazimzumbwi Forest Reserve and on the Pugu Hills (latter Tanzanian forest reserves rapidly declining though). Typical trees include *Tabernaemontana pachysiphon*, *Antiaris toxicaria*, *Trichilia emetica*, and *Bombax rhodognaphalon*, and many forest stands are dominated by legumes (*Cynometra*, *Craibia*, *Julbernardia*, *Berlinia*, *Brachystegia*). Many plants and animals are endemic. Since some of these genera and species occur also in the Guineo-Congolian rain forests the Eastern African coastal dry forest are perhaps relicts of a former pan-African lowland forest. Dry semi-deciduous forests similar in physiognomy and composition exist in the Baro lowlands of western Ethiopia. Deciduous dry forests harbor a high diversity of Orthoptera, especially in Ensifera. Orthoptera dependent on this kind of habitat are therefore highly endangered these days, as was suggested for the phaneropterine *Tropidonotacris grandis*. *Allaga ambigua* (Catantopinae) occurs in this habitat, a species listed on the IUCN red list of threatened species. From the coastal plains at an elevation of 100–400 m a.s.l. rise the mountains of the Eastern Arc, a disjunct range of old metamorphic mountains in south-eastern Kenya and eastern Tanzania. At the base of these mountains below 800 m a.s.l. (Ulugurus, Udzungwas and East Usambaras), where precipitation increases to over 2000 mm, some of the few existing patches of relict lowland rainforest in East Africa occur. Located in the transition from coastal dry forest to the wet submontane forests they harbor elements of the coastal forests but differ completely in physiognomy and structure with a tall canopy of about 40 m and emergents to 50 m. Typical tree species are *Antiaris toxicaria*, *Funtumia africana*, *Angylocalyx braunii*, *Afrosersalisia cerasifera*, and *Pachystela msoslo* with a very high number of endemic species.

### ii. Submontane forests

Continuing upwards from the lowland forest, the montane forests of East Africa can be divided into several elevational belts. Apart from temperature, precipitation is the main factor determining forest zonation (structure and species composition). Submontane forests cover the foothills of the East African mountains. Due to dense human settlements in such situations, only few relicts in particular of moist evergreen forests are left. At the Eastern Arc Mountains located in the low Tanzanian coastal plains they start at 800 m, ranging to 1250–1400 m. On the East Usambaras, Ngurus and Ulugurus such submon-

## Climate and Vegetation

tane moist forests are botanically very rich and consist of *Allanblackia stuhlmannii*, *Cephalosphaera usambarensis*, *Beilschmiedia kweo*, *Parinari excelsa* and *Newtonia buchananii*, receiving a well-distributed rainfall of more than 1800 mm. Further inland, the submontane zones occur at about 1100–1700 m. The Taita Hills and Mt Kasigau in Kenya, both belonging to the Eastern Arc Mountains, have small remnants of submontane forests dominated by *Newtonia buchananii* in an elevation between 1100 m and 1700 m.

The submontane forests of the Eastern Arc Mountains are also one of the most species-rich areas for bushcrickets, especially in Phaneropterinae but also for Pseudophyllinae and Meconematinae. Thus almost every range of these Eastern Arc Mountains harbors endemic species e.g. in *Gonatoxia*, *Parapyrrhicia*, *Eurycorypha*, *Plangia*, *Dioncomena*, *Pseudotomias*, *Afrophisis*, *Phlugidia* or *Amytta*.

In the cultivated submontane zone of the wet southern slopes of Mt Kilimanjaro forest is restricted to deep valleys and gorges. These forests, although of very small extent (15 km<sup>2</sup>), are of great biogeographical and palaeobotanical importance: they resemble very much the highly diverse moist forests of the Pare and Usambara Mountains. Typical trees are *Entandrophragma excelsum* (Meliaceae, growing up to over 80 m – at present the tallest tree of Africa), *Heinsenia diervilleoides* and *Mitragyna rubrostipulata* (both Rubiaceae), *Newtonia buchananii* (Mimosaceae), *Leptonychia usambarensis* (Sterculiaceae), *Strombosia scheffleri* (Loganiaceae), *Dasylepis integra* (Flacourtiaceae) and *Garcinia tanzaniensis* (Hypericaceae).

On the drier northern mountain slopes, semi-deciduous or deciduous dry (succulent) forest types occur in the submontane zone. With a rainfall of 600–800 mm deciduous trees and succulents dominate (*Commiphora*, *Uvaria*, *Grewia*, *Combretum*, *Lonchocarpus*, *Euphorbia*) together with *Lecaniodiscus fraxinifolius* and *Teclea simplicifolius*. The shrub layer of these forests is very dense. Such forests grade into savanna woodlands e.g. at the foothills of the Pare Mts and the Taita Hills. Higher rainfall (800–1100 mm) favors the growth of semi-evergreen *Croton-Calodendrum* forests, e.g. on the western slopes below 1600 meters and on the northern slopes below 2000 meters of Kilimanjaro and in the Kenyan highlands around Nairobi, Ngong and Nyeri, as well as in northern Kenya on isolated mountains e.g. on the Matthews Range. Such relatively dry submontane forests are dominated by *Olea europaea* ssp. *africana* (Oleaceae), *Croton megalocarpus* (Euphorbiaceae), *Calodendrum capense* (Rutaceae), *Diospyros abyssinica* (Ebenaceae), and *Brachylaena huillensis* (Asteraceae).

### iii. Montane forests

The montane forests in East Africa above 1600 m lie mainly on the lower slopes of the major mountains, and in Kenya, e.g. the Cherenгани Hills. Kilimanjaro in Tanzania has the most extensive forest gradient in elevation and climate and can therefore serve as an example of forest zonation in East Africa. On the wet southern slopes, the dominant tree species is camphor (*Ocotea usambarensis*; Lauraceae). Moist evergreen camphor forests cover an area of about 220 km<sup>2</sup> at



**Fig. Climate 3.** Montane forest rich in palm trees in the Taita Hills, Kenya at 1700 m.

Kilimanjaro. In the lower areas (1800–2200 m) *Ocotea usambarensis* is associated with *Agauria salicifolia* (Ericaceae), *Macaranga kilimanjarica* (Euphorbiaceae), *Syzygium guineense* (Myrtaceae), and *Polyscias fulva* (Araliaceae). Between 2200–2500 m is the main habitat of camphor where pure stands exist. Here humidity reaches its maximum with an annual precipitation partly exceeding 3000 mm, indicated by the wealth of epiphytes and ferns, in particular filmy ferns and tree ferns. In gorges and long streams, *Afrocrania volkensii* (Cornaceae) is an important constituent of the tree layer. Higher up the Gymnosperm *Podocarpus latifolius* (Podocarpaceae) starts to prevail, replacing *Ocotea* with an increasing altitude between 2500 and 2800 m. Above, between 2800–3200 m, *Podocarpus latifolius*, *Hagenia abyssinica* (Rosaceae) and *Prunus africana* (Rosaceae) form the tree canopy. Monodominant stands of *Erica excelsa* (Ericaceae) play also an important role in this upper montane zone, replacing *Podocarpus* and *Hagenia* forests after fire, forming the actual upper closed forest line at 3200 m. However, small remnants and burnt forests indicate that the upper closed forest line reached much higher up recently (1997); remnants of subalpine *Erica trimera* forests with tree heights up to 10 m mark the former and potential upper closed forest line at above 4000 m, representing today the highest situated forests in Africa. The montane forests of the northern and western slopes are completely different in species composition and structure due to lower precipitation. The lower and middle montane forest types (1600–2500 m) on the eastern, northern, and western slopes extending over 280 km<sup>2</sup> are characterized by *Cassipourea malosana* (Rhizophoraceae), *Teclea simplicifolia* (Rutaceae), *Fagaropsis angolensis* (Rutaceae) and *Olea capensis*. *Cassipourea* forests on the south western slope with species of *Ocotea* forests and *Dasylepis integra* (Flacourtiaceae) in the tree layer represent an intermediate forest type. Similar *Ocotea* forests prevail in the nearby Taita Hills, and the Pare and Usambara Mountains under similar climatic conditions. Between 2500 m and 3100 m *Juniperus procera* (Juniperaceae), *Podocarpus latifolius* and *falcatus*, *Nuxia congesta*, and *Hagenia abyssinica* are dominant tree species on

the northern slope. A similar forest zonation can be found on the other high mountains reaching over 4000 m, e.g. Mt Meru, Mt Kenya, Mt Elgon and the Karamoja Mountains, the Aberdares, the Virunga volcanoes and the Ethiopian highlands. However, only on Mt Kenya do extensive camphor forests like those on Kilimanjaro exist, the other mountains possibly being too dry to support *Ocotea usambarensis*. In Uganda, *Ocotea usambarensis* does not occur at all, even on the very wet Ruwenzori.

A typical component of most high mountains in East Africa are dense bamboo forests, which cover vast areas on the wet mountain slopes above 2500 m, e.g. on Mt Kenya, Mt Elgon, Ruwenzori, the Virunga volcanoes and the Aberdares. A striking feature of the forests of Kilimanjaro is the absence of such a bamboo zone. Bamboo stands are favored by elephants and buffaloes. On Kilimanjaro these mega-herbivores occur on the northern slopes, where it is too dry for a bamboo zone to develop. They are excluded from the wet southern slope forests by deep gorges and by humans, who have cultivated the foothills for at least 2000 years. This interplay of biotic and abiotic factors could explain not only the lack of a bamboo zone on Kilimanjaro but also offers possible explanations for diversity and endemism patterns of this mountain. Kilimanjaro's forests can, therefore, serve as a striking example of the large and long-lasting influence of both animals and humans on the African landscape. Bamboo forests do not generally serve as good habitat for Orthoptera, so this vegetation unit is comparatively poor.

Tropical forests worldwide are threatened by many factors associated with human population pressure and climate change, but Afromontane forests may be particularly vulnerable because they are located in areas long favored by human occupation and where human population growth rate is high (e.g. currently 3.24% / annum in Uganda, 3.28% / annum in Burundi, 4.12% / annum in South Sudan). Major threats to Afromontane forests include forest clearance or fragmentation by fire for agriculture, tea plantations, grazing or mining, logging, selective harvesting, and hunting. With an annual forest clearance of about 150,000 to 200,000 ha, the forest cover of Ethiopia was reduced to 16% during the 1950s and to 2.7% by 1989. Ethiopian montane forests are now reduced to small patches of high elevation *Podocarpus* and *Juniperus* covering less than 1% of the area.

### Alpine vegetation

The flora and vegetation of the tropical-alpine regions found above the montane forests on the African mountains is sharply distinct from that of the surrounding tropical lowlands. The mountains on which this flora occurs form a series of isolated 'sky-islands' or 'archipelago-like regions'. The affinities of this African tropical-alpine flora is closer to the temperate Eurasian than to the surrounding Afrotropical flora. Alpine environments of East African mountains (e.g. Simien and Bale Mts in Ethiopia, Mt Kenya, the Aberdares, Mt Elgon in Kenya/Uganda, Ruwenzori, and the Virunga volcanoes in Uganda/

Rwanda, Mt Kilimanjaro and Mt Meru in Tanzania) are famous for their endemic and charismatic taxa, such as the giant *Lobelia*, *Dendrosenecio* and shrubby *Alchemilla*, *Helichrysum* and *Hypericum* with very special growth forms. Hedberg (1964) stresses the enormous physiological strain on plants in this region, that in the mornings may experience sunlit, transpiring leaves while the root system is still frozen. The upper limit of the Afroalpine belt is defined by the absence of a vegetation cover, or the presence of a permanent snowline (= nival zone), which occurs at about 4500–5000 m. The lower boundary of any alpine zone is commonly defined by the presence of a tree line, which is e.g. at 4000 m on Kilimanjaro. Between tree line and the closed forest line normally lies a transitional vegetation zone of several hundred meters in elevation.

This subalpine zone between the broad-leaf montane forest and the alpine *Helichrysum* scrub vegetation corresponds closely to the "ericaceous belt" and is a result of recurring fires or – on Mt Elgon or in Ethiopia – of fire and grazing.

The vegetation of the subalpine zone consists of ericaceous shrublands, which represent different regeneration stages of burnt *Hagenia*, *Podocarpus*, and *Erica excelsa* forests. Due to the open canopy of the shrub layer (*Erica arborea*, *E. trimera*, *Protea caffra*, *Stoebe kilimandscharica*, *Anthospermum usambarensis* and *Adenocarpus mannii*) many alpine species occur in alpine *Helichrysum* scrub. In areas with a high fire frequency, tussock grasslands ("moorlands") with *Festuca*, and giant lobelias are widespread, e.g. on the Aberdares, on the south-eastern slope of Mt Kilimanjaro, Mt Elgon, and Mt Kenya. In contrast to the dry moorlands, *Carex* bogs – an important habitat of *Dendrosenecio* – occur on wet sites along streams or water sources. Between 3900–4000 m and 4500 m alpine dwarf scrub covers huge areas, where *Helichrysum* and *Senecio* are dominant and rich in species.

Alpine habitats are usually almost devoid of Orthoptera except for a few endemic species adapted to high altitudes (e.g. from the Pyrgomorphid genus *Parasphena*).

**Fig. Climate 4.** *Erica* and *Helichrysum* vegetation around a swampy area with *Dendrosenecio* at 3800 m on the southern slopes of Mt Kilimanjaro.



## Species List of the Bushcrickets, Wetas and Raspy Crickets of Tanzania and Kenya

**Tettigoniidae****Conocephalinae****Agraeciini**

*Afroagraecia bloyeti* (Brongniart, 1897)  
*Afroagraecia brachyptera* Hemp & Ingrisch, 2013  
*Afroagraecia kisarawe* Hemp, 2017  
*Afroagraecia flava* Hemp, 2019  
*Afroagraecia furcata* Hemp, 2019  
*Afroagraecia jozani* Hemp, 2019  
*Afroagraecia mangula* Hemp, 2017  
*Afroagraecia nguruensis* Hemp, 2019  
*Afroagraecia panteli* (Karny, 1907)  
*Afroagraecia pwanina* Hemp & Ingrisch, 2013  
*Afroagraecia sansibara* (Redtenbacher, 1891)  
*Afroagraecia shimbaensis* Hemp, 2013  
*Afroanthracites discolor* Hemp et al., 2013  
*Afroanthracites guttatus* Hemp, 2019  
*Afroanthracites inopinatus* Hemp, 2019  
*Afroanthracites jagoi* Ünal & Hemp, 2013  
*Afroanthracites lineatus* Hemp, 2019  
*Afroanthracites lutindi* Hemp, 2015  
*Afroanthracites maculatus* Hemp, 2019  
*Afroanthracites magamba* Hemp, 2019  
*Afroanthracites montium* (Sjöstedt, 1909)  
*Afroanthracites ngologolo* Hemp, 2017  
*Afroanthracites nguru* Hemp, 2017  
*Afroanthracites pommeri* Hemp, 2019  
*Afroanthracites pseudodiscolor* Hemp, 2015  
*Afroanthracites uluguruensis* Hemp & Ünal, 2013  
*Afroanthracites usambaricus* (Sjöstedt, 1913)  
*Afroanthracites viridis* Hemp et al., 2013  
*Dendrobia amaniensis* Hemp & Ingrisch, 2017  
*Dendrobia octopunctata* Hemp, 2017  
*Dendrobia plagata* Hemp, 2019

**Spiny-headed, Meadow and Coneheaded Bushcrickets****Agraeciine Bushcrickets**

Bloyet's Afroagraecia  
Short-winged Afroagraecia  
Kisarawe Afroagraecia  
Yellow Afroagraecia  
Forked Afroagraecia  
Jozani Afroagraecia  
Udzungwa Afroagraecia  
Nguru Afroagraecia  
Pantel's Afroagraecia  
Coastal Afroagraecia  
Zanzibar Afroagraecia  
Shimba Hills Afroagraecia  
Colourful Afroanthracites  
North Pare Afroanthracites  
Unexpected Afroanthracites  
Jago's Afroanthracites  
Striped Afroanthracites  
Lutindi Afroanthracites  
South Pare Afroanthracites  
Magamba Afroanthracites  
Montane Afroanthracites  
Udzungwa Afroanthracites  
Nguru Afroanthracites  
Pommer's Afroanthracites  
Lutindi colourful Afroanthracites  
Uluguru Afroanthracites  
West Usambara Afroanthracites  
Green Afroanthracites  
Amani Tree Summiteer  
Eight-dotted Tree Summiteer  
Nguru Tree Summiteer

**Conocephalini, Conocephalina**

*Conocephalus (Megalotheca) phasma* Gorochoch & Ld Moral, 2004  
*Conocephalus (Anisoptera) maculatus* (Le Guillou, 1841)  
*Conocephalus (Anisoptera) iris* (Serville, 1839)  
*Conocephalus (Conocephalus) conocephalus* (Linné, 1767)

**Meadow Bushcrickets**

East African Rifle-shaped Meadow Bushcricket  
Mottled Meadow Bushcricket  
Rainbow Meadow Bushcricket  
Common Meadow Bushcricket

**Conocephalini, Karniellina**

*Acanthoscirtes albostriatus* Hemp, 2012  
*Chortoscirtes masaiicus* Hemp, 2010

White-striped Thorny Meadow Hopper  
Masai Brown Meadow Hopper

<i>Chortoscirtes meruensis</i> (Sjöstedt, 1909)	Meru Brown Meadow Hopper
<i>Chortoscirtes pseudomeruensis</i> Hemp, 2010	East Kilimanjaro Brown Meadow Hopper
<i>Chortoscirtes puguensis</i> Hemp, 2010	Pugu Brown Meadow Hopper
<i>Chortoscirtes serengeti</i> Hemp, 2010	Serengeti Brown Meadow Hopper
<i>Fulvoscirtes fulvotaitensis</i> Hemp, 2012	Taita Orange Meadow Hopper
<i>Fulvoscirtes fulvus</i> Hemp, 2012	Bright Orange Meadow Hopper
<i>Fulvoscirtes kilimandjaricus</i> (Sjöstedt, 1909)	South Kilimanjaro Orange Meadow Hopper
<i>Fulvoscirtes laticercus</i> Hemp, 2012	Sabuk Orange Meadow Hopper
<i>Fulvoscirtes legumishera</i> Hemp, 2012	North Kilimanjaro Orange Meadow Hopper
<i>Fulvoscirtes manyara</i> Hemp, 2012	Manyara Orange Meadow Hopper
<i>Fulvoscirtes sylvaticus</i> Hemp, 2012	Forest Orange Meadow Hopper
<i>Fulvoscirtes viridis</i> Hemp, 2012	Green Orange Meadow Hopper
<i>Melanoscirtes kibonotensis</i> (Sjöstedt, 1909)	Kibonoto Black Meadow Hopper
<i>Melanoscirtes shengena</i> Hemp, 2010	South Pare Black Meadow Hopper
<i>Melanoscirtes taitensis</i> Hemp, 2010	Taita Black Meadow Hopper
<i>Melanoscirtes usambaricus</i> Hemp, 2010	Usambara Black Meadow Hopper
<i>Phlesirtes brachiatus</i> Uvarov, 1924	Short Montane Meadow Hopper
<i>Phlesirtes chyuluensis</i> Hemp, 2017	Chyulu Montane Meadow Hopper
<i>Phlesirtes elgonensis</i> Hemp, 2017	Elgon Montane Meadow Hopper
<i>Phlesirtes githunguri</i> Hemp, 2017	Githunguri Montane Meadow Hopper
<i>Phlesirtes gladiolus</i> Hemp, 2017	Flower Montane Meadow Hopper
<i>Phlesirtes hanangensis</i> Hemp, 2017	Hanang Montane Meadow Hopper
<i>Phlesirtes keniensis</i> Hemp, 2017	Kenya Montane Meadow Hopper
<i>Phlesirtes kilimontanus</i> Hemp, 2017	Kilimanjaro Montane Meadow Hopper
<i>Phlesirtes laikipiaensis</i> Hemp, 2017	Laikipia Montane Meadow Hopper
<i>Phlesirtes latifrons</i> Chopard, 1954	Broad-headed Montane Meadow Hopper
<i>Phlesirtes limuru</i> Hemp, 2017	Limuru Montane Meadow Hopper
<i>Phlesirtes mauensis</i> Hemp, 2017	Mau Montane Meadow Hopper
<i>Phlesirtes melanocercus</i> Hemp, 2017	Black Montane Meadow Hopper
<i>Phlesirtes merumontanus</i> (Sjöstedt, 1909)	Northern Tanzanian Montane Meadow Hopper
<i>Phlesirtes ngongensis</i> Hemp, 2017	Ngong Montane Meadow Hopper
<i>Phlesirtes ngorongoroensis</i> Hemp, 2017	Ngorongoro Montane Meadow Hopper
<i>Phlesirtes nou</i> Hemp, 2017	Nou Montane Meadow Hopper
<i>Phlesirtes timboroa</i> Hemp, 2017	Timboroa Montane Meadow Hopper

**Copiphorini**

<i>Lanista varelai</i> Bolívar, 1906	Varela's Mimicking Snout Nose
<i>Pseudorhynchus pungens pungens</i> (Schaum, 1853)	Stabbing Mimicking Snout Nose
<i>Ruspolia differens</i> (Serville, 1839)	Variable Conehead
<i>Ruspolia fuscopunctata</i> (Karny, 1907)	Brown-dotted Conehead
<i>Ruspolia exigua</i> (Bolívar, 1922)	Montane Conehead

**Cone-headed Bushcrickets****Hetrodinae**

<i>Enyaliopsis bloyeti</i> (Lucas, 1885)	Bloyet's Armoured Ground Bushcricket
<i>Enyaliopsis carolinus</i> Sjöstedt, 1913	Caroline's Armoured Ground Bushcricket
<i>Enyaliopsis ephippiatus</i> (Gerstäcker, 1869)	Saddled Armoured Ground Bushcricket
<i>Enyaliopsis jennae</i> Glenn, 1991	Jenna's Armoured Ground Bushcricket

**Armoured Ground Bushcrickets**

## Species List

<i>Enyaliopsis</i> sp.	Mpwapwa Armoured Ground Bushcricket
<i>Eugasteroides loricatus loricatus</i> (Gerstaecker, 1869)	Tank Armoured Ground Bushcricket
<i>Gymnoproctus rammei</i> Weidner, 1941	Ramme 's Armoured Ground Bushcricket
<i>Gymnoproctus sculpturatus</i> Schmidt, 1990	Sculptured Armoured Ground Bushcricket
<i>Gymnoproctus similis</i> Weidner, 1955	Striped Armoured Ground Bushcricket
<i>Spalacomimus magnus</i> (La Baume, 1911)	Large Armoured Ground Bushcricket
<i>Spalacomimus stettinensis</i> Weidner, 1941	Von Stetten 's Armoured Ground Bushcricket
<i>Spalacomimus talpa</i> (Gerstäcker, 1869)	Smooth Armoured Ground Bushcricket
<i>Spalacomimus verruciferus</i> (Karsch, 1887)	Warty Armoured Ground Bushcricket

### Hexacentrinae

<i>Aerotegmina kilimandjarica</i> Hemp, 2001	Kilimanjaro Balloon
<i>Aerotegmina megaloptera</i> Hemp, 2013	Coastal Balloon
<i>Aerotegmina shengena</i> Hemp, 2006	South Pare Balloon
<i>Aerotegmina taitensis</i> Hemp, 2013	Taita Balloon
<i>Aerotegmina vociferator</i> Hemp, 2018	Whistling Balloon

### Fierce Predatory Bushcrickets

### Meconematinae

<i>Afrophisis flagellata</i> Hemp, 2013	Flagellate Spider Bushcricket
<i>Afrophisis kisarawe</i> Hemp, 2013	Kisarawe Spider Bushcricket
<i>Afrophisis mazumbaiensis</i> Hemp, 2013	Mazumbai Spider Bushcricket
<i>Afrophisis pseudoflagellata</i> Hemp, 2013	Pseudoflagellate Spider Bushcricket
<i>Afrophisis tanzanica</i> Jin & Kevan, 1991	Tanzanian Spider Bushcricket
<i>Afrophisis undosa</i> Hemp, 2017	Wavy Spider Bushcricket
<i>Amytta abbreviata</i> Karsch, 1888	Short Delicate Vibrating Bushcricket
<i>Amytta digitata</i> Hemp, 2017	Lutindi Delicate Vibrating Bushcricket
<i>Amytta hanangensis</i> Hemp, 2017	Hanang Delicate Vibrating Bushcricket
<i>Amytta judithae</i> Hemp, 2017	Judith 's Delicate Vibrating Bushcricket
<i>Amytta kilimandjarica</i> Hemp, 2001	Kilimanjaro Delicate Vibrating Bushcricket
<i>Amytta kilomeni</i> Hemp, 2017	North Pare Delicate Vibrating Bushcricket
<i>Amytta meruensis</i> Hemp, 2017	Meru Delicate Vibrating Bushcricket
<i>Amytta merumontana</i> Hemp, 2017	Merumontane Delicate Vibrating Bushcricket
<i>Amytta mramba</i> Hemp, 2017	Mramba Delicate Vibrating Bushcricket
<i>Amytta olindo</i> Hemp, 2001	Pale Delicate Vibrating Bushcricket
<i>Amytta pellucida</i> Karsch, 1888	Long-winged Delicate Vibrating Bushcricket
<i>Amytta savannae</i> Hemp, 2017	Savanna Delicate Vibrating Bushcricket
<i>Amytta taitensis</i> Hemp, 2007	Taita Delicate Vibrating Bushcricket
<i>Amytta ukamica</i> Beier, 1965	Ukami Delicate Vibrating Bushcricket
<i>Phlugidia africana</i> Kevan & Jin, 1993	East African Phlugidia
<i>Phlugidia ampenticulata</i> Hemp, 2017	Pendant Phlugidia
<i>Phlugidia kisarawe</i> Hemp, 2017	Kisarawe Phlugidia
<i>Phlugidia obtusicercus</i> Hemp, 2013	Blunt-tipped Phlugidia
<i>Phlugidia planicercus</i> Hemp, 2013	Flattened Phlugidia
<i>Phlugidia usambarica</i> Hemp, 2002	Usambara Phlugidia

### Vibrating Bushcrickets

### Saginae

<i>Clonia (Clonia) jagoi</i> Kaltenbach, 1971	Jago 's Clonia
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### Stick or Predatory Bushcrickets

**Mecopodinae**

*Anoedopoda lamellata* (Linné, 1758)  
*Apteroscirtus cristatus* Hemp, 2013  
*Apteroscirtus densissimus* Hemp, 2020  
*Apteroscirtus planidorsatus* Hemp, 2013  
*Gymnoscirtus coriferus* Hemp, 2020  
*Gymnoscirtus unguiculatus* Karsch, 1888  
*Philoscirtus cordipennis* ssp. Karsch, 1896  
*Philoscirtus viridulus* Hemp, 2014

**Brown Ground or Long-legged Bushcrickets**

Smooth Noisy Brown Ground Bushcricket  
 Scaly Flightless Brown Ground Bushcricket  
 Stout Flightless Brown Ground Bushcricket  
 Smooth Flightless Brown Ground Bushcricket  
 Wingless Naked Brown Ground Bushcricket  
 Common Naked Brown Ground Bushcricket  
 East Usambara & Nguru Rugose Long-legged Bushcricket  
 Green Rugose Long-legged Bushcricket

**Phaneropterinae****Acrometopini**

*Altihoratosphaga basalis* Hemp, 2017  
*Altihoratosphaga chenene* Hemp, 2017  
*Altihoratosphaga hanangensis* Hemp et al., 2010  
*Altihoratosphaga helleri* Hemp, 2017  
*Altihoratosphaga montivaga* (Sjöstedt, 1909)  
*Altihoratosphaga nomima* (Karsch, 1896)  
*Altihoratosphaga nou* Hemp, 2006  
*Altihoratosphaga simbo* Hemp, 2017  
*Horatosphaga heteromorpha* (Karsch, 1888)  
*Horatosphaga laticerca* Hemp, 2019  
*Horatosphaga leggei* (Kirby, 1909)  
*Horatosphaga parensis* Hemp, 2002  
*Horatosphaga regularis* (Bolivar, 1922)  
*Horatosphaga sabuk* Hemp, 2006  
*Horatosphaga scalata* Hemp, 2019  
*Lamecosoma miombo* Hemp, 2017  
*Lamecosoma inerme* Ragge, 1961  
*Peronura clavigera* Karsch, 1888  
*Peronura hildebrandtiana* Karsch, 1889  
*Peronura uguenoensis* Hemp, 2002  
*Peronura usambarica* Hemp, 2017  
*Peronura wottae* Hemp, 2019  
*Peronurella centralis* Hemp, 2017  
*Tenerasphaga chyuluensis* Hemp, 2017  
*Tenerasphaga hanangensis* Hemp, 2017  
*Tenerasphaga meruensis* (Sjöstedt, 1909)  
*Tenerasphaga mpwapwae* Hemp, 2019  
*Tenerasphaga nanyuki* Hemp, 2017  
*Tenerasphaga tenera* Hemp, 2007

**Leaf or Broad-winged Bushcrickets**

Ancient Dotted Bushcricket  
 Chenene Dotted Bushcricket  
 Hanang Dotted Bushcricket  
 Heller 's Dotted Bushcricket  
 Montane Dotted Bushcricket  
 Mpwapwa Dotted Bushcricket  
 Manyara Dotted Bushcricket  
 Simbo Dotted Bushcricket  
 Variable Grass Bushcricket  
 Ladle Grass Bushcricket  
 Legge 's Grass Bushcricket  
 Pare Grass Bushcricket  
 Regular Grass Bushcricket  
 Sabuk Grass Bushcricket  
 Ladder Grass Bushcricket  
 Miombo Elongate Grass Bushcricket  
 Unarmed Elongate Grass Bushcricket  
 Common Plump Bushcricket  
 Taita Plump Bushcricket  
 Pare Plump Bushcricket  
 Usambara Plump Bushcricket  
 Wotta Plump Bushcricket  
 Common Fragile Plump Bushcricket  
 Chyulu Fragile Grass Bushcricket  
 Hanang Fragile Grass Bushcricket  
 Meru Fragile Grass Bushcricket  
 Mpwapwa Fragile Grass Bushcricket  
 Nanyuki Fragile Grass Bushcricket  
 Ngong Fragile Grass Bushcricket

**Amblycoryphini**

*Eurycorypha annexata* Hemp, 2017  
*Eurycorypha binasuta* Hemp, 2017  
*Eurycorypha combretoides* Hemp, 2013  
*Eurycorypha conclusa* Hemp, 2013

Coupling Ant-mimicking Bushcricket  
 Two-nosed Ant-mimicking Bushcricket  
 Bushwillow Ant-mimicking Bushcricket  
 Round-winged Ant-mimicking Bushcricket

## Species List

<i>Eurycorypha curviflava</i> Hemp, 2017	White-spotted Ant-mimicking Bushcricket
<i>Eurycorypha divertata</i> Hemp, 2017	Divergent Ant-mimicking Bushcricket
<i>Eurycorypha elongata</i> Hemp, 2017	Elongated Ant-mimicking Bushcricket
<i>Eurycorypha flexata</i> Hemp, 2017	Bent Ant-mimicking Bushcricket
<i>Eurycorypha kenyensis</i> Massa, 2016	Kenya Ant-mimicking Bushcricket
<i>Eurycorypha kevani</i> Chopard, 1954	Kevan's Ant-mimicking Bushcricket
<i>Eurycorypha ligata</i> Hemp, 2017	Hoe-shaped Ant-mimicking Bushcricket
<i>Eurycorypha meruensis</i> Sjöstedt, 1909	Meru Ant-mimicking Bushcricket
<i>Eurycorypha pianofortis</i> Hemp, 2017	Piano-songed Ant-mimicking Bushcricket
<i>Eurycorypha pseudomeruensis</i> Hemp, 2017	False Meru Ant-mimicking Bushcricket
<i>Eurycorypha pseudovaria</i> Hemp, 2017	False Variable Ant-mimicking Bushcricket
<i>Eurycorypha punctipennis</i> Chopard, 1938	Dotted Ant-mimicking Bushcricket
<i>Eurycorypha resonans</i> Hemp, 2013	Resonant Ant-mimicking Bushcricket
<i>Eurycorypha simillima</i> Chopard, 1954	Even Ant-mimicking Bushcricket
<i>Eurycorypha varia</i> Brunner v. Wattenwyl, 1891	Variable Ant-mimicking Bushcricket
<i>Eurycorypha victoriae</i> Hemp, 2017	Lake Victoria Ant-mimicking Bushcricket
<i>Plangia amaniensis</i> Hemp, 2017	Amani Plangia
<i>Plangia</i> sp.	Coastal Plangia
<i>Plangia multimaculata</i> Hemp, 2015	Spotted Plangia
<i>Plangia satsiscaerulea</i> Hemp, 2015	Green Plangia
<i>Plangia variacantans</i> Hemp, 2017	Variable Singing Plangia

## Catoptropterigini

<i>Catoptropteryx aurita</i> Huxley, 1970	Eastern Orange-spot
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## Ducetiini

<i>Ducetia biramosa</i> (Karsch, 1888)	Smooth Pectinated Bushcricket
<i>Ducetia punctipennis</i> (Gerstäcker, 1869)	Spotted Pectinated Bushcricket
<i>Ducetia</i> sp.	Mpwapwa Pectinated Bushcricket

## Holochlorini

<i>Arantia fasciata</i> (Walker, 1869)	Striped-eyed Arantia
<i>Arantia tanzanica</i> Hemp & Massa, 2017	Tanzania Arantia
<i>Gonatoxia furcata</i> Hemp, 2016	Forked Yellow Surprise
<i>Gonatoxia helleri</i> Hemp, 2016	Heller's Yellow Surprise
<i>Gonatoxia immaculata</i> Karsch, 1889	Unspotted Yellow Surprise
<i>Gonatoxia maculata</i> Karsch, 1888	Spotted Yellow Surprise
<i>Gonatoxia</i> sp.	Coastal Yellow Surprise

## Odontoturini

<i>Monticolaria kilimandjarica</i> Sjöstedt, 1909	Kilimanjaro Mountain Walker
<i>Monticolaria manyara</i> Hemp, 2010	Manyara Mountain Walker
<i>Monticolaria meruensis</i> Sjöstedt, 1909	Meru Mountain Walker
<i>Odonturoides hanangensis</i> Hemp, 2009	Hanang Odonturoides
<i>Odonturoides insolitus</i> Ragge, 1980	Curious Odonturoides
<i>Odonturoides jagoi</i> Ragge, 1980	Jago's Odonturoides
<i>Odonturoides plasoni</i> (Ebner, 1915)	Shielded Odonturoides



**Otiaphysini**

<i>Debrona cervina</i> Walker, 1870	Broad-winged Debrona
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**Pardalotini**

<i>Poecilogramma striatifemur</i> Karsch, 1887	White-striped Poecilogramma
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**Phaneropterini**

<i>Dioncomena jagoi</i> Ragge, 1980	Jago's Jewel
<i>Dioncomena ornata</i> Brunner v. Wattenwyl, 1878	Blue Jewel
<i>Dioncomena tanneri</i> Ragge, 1980	Tanner's Jewel
<i>Dioncomena scutellata</i> Hemp, 2017	Flappy Jewel
<i>Dioncomena</i> sp.	Udzungwa Jewel
<i>Dioncomena</i> sp.	Uluguru Jewel
<i>Dioncomena zernyi</i> Ragge, 1980	Zernyi's Jewel
<i>Kefalia grafika</i> Hemp, 2019	Graphic Kefalia
<i>Kefalia laeta</i> Hemp, 2019	Colourful Kefalia
<i>Kefalia omorpha</i> Hemp, 2019	Beautiful Kefalia
<i>Melidia laminata</i> Chopard, 1954	Fragile Savanna Bushcricket
<i>Melidia adfinia</i> Hemp, 2019	Miombo Savanna Bushcricket
<i>Parapyrrhicia abdita</i> Hemp, 2016	Hidden Glinting Eye
<i>Parapyrrhicia acutilobata</i> Ragge, 1980	Pointed Glinting Eye
<i>Parapyrrhicia diamantina</i> Hemp, 2016	Diamond Glinting Eye
<i>Parapyrrhicia globulata</i> Hemp, 2016	Uluguru Glinting Eye
<i>Parapyrrhicia litipo</i> Hemp, 2016	Litipo Glinting Eye
<i>Parapyrrhicia niloensis</i> Hemp, 2016	Nilo Glinting Eye
<i>Parapyrrhicia zanzibarica</i> Brunner v. Wattenwyl, 1891	Zanzibar Glinting Eye
<i>Phaneroptera sparsa</i> (Stål, 1857)	African sickle-bearing Bushcricket

**Terpnistrini**

<i>Diogena fausta</i> (Burmeister, 1838)	Gracious Acacia Bushcricket
<i>Gelotopoia amabilis</i> Hemp, 2013	Beautiful Two-coloured Bushcricket
<i>Terpnistria zebrata</i> (Serville, 1839)	Striped Acacia Bushcricket

**Tylopsidini**

<i>Tylopsis continua</i> (Walker, 1869)	Brown-striped Lily Bushcricket
<i>Tylopsis dispar</i> Sjöstedt, 1909	Uneven Lily Bushcricket
<i>Tylopsis rubescens</i> Kirby, 1900	Red Lily Bushcricket

**Ungrouped Phaneropterinae**

<i>Ectomoptera nepicauda</i> Ragge, 1980	Fragile Cut-away
<i>Eulioptera bilobata</i> -complex	Bilobate False Sickle-bearing Bushcrickets
<i>Eulioptera excavata</i> Hemp, 2019	Excavated False Sickle-bearing Bushcricket
<i>Eulioptera montana</i> Ragge, 1980	Chyulu False Sickle-bearing Bushcricket
<i>Eulioptera monticola</i> Ragge, 1980	Montane False Sickle-bearing Bushcricket
<i>Eulioptera reticulata planilima</i> Ragge, 1980	Reticulate False Sickle-bearing Bushcricket
<i>Euryastes jagoi</i> Ragge, 1980	Usambara Inflated Tree Bushcricket
<i>Lunidia acutercata</i> Hemp, 2017	Coastal Halfmoon

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<i>Lunidia bicercata</i> Hemp, 2017	Uluguru Halfmoon
<i>Lunidia viridis</i> Hemp, 2010	Green Halfmoon
<i>Materuana eriki</i> Hemp, 2017	Erik 's Red Eye
<i>Meruterrana elegans</i> Sjöstedt, 1912	Elegant Yellow-Black Bushcricket
<i>Oxyecous apertus</i> Ragge, 1956	Bluegreen Flat-Thorn
<i>Oxyecous magnus</i> Ragge, 1956	Great Flat-Thorn
<i>Oxyecous undulatus</i> Ragge, 1956	Wavy Flat-Thorn
<i>Pseudopreussia flavifolia</i> Hemp, 2017	Coastal Yellow Leaf
<i>Sentia communis</i> Hemp, 2019	Common Sentia
<i>Tropidonotacris grandis</i> Ragge, 1957	Great Ridgeback

### Pseudophyllinae

<i>Acauloplax exigua</i> Karsch, 1891	Fragile False-Leaf
<i>Cymatomera denticollis</i> Schaum, 1853	Common Bark Bushcricket
<i>Cymatomera paradoxa</i> Gerstäcker, 1869	Spiny Bark Bushcricket
<i>Cymatomera viridimaculata</i> Hemp, 2013	Green Bark Bushcricket
<i>Cymatomerella muta</i> Beier, 1954	Plump Bark Bushcricket
<i>Cymatomerella morula</i> Hemp, 2019	Black Bark Bushcricket
<i>Cymatomerella pardopunctata</i> Hemp, 2013	Leopard Bark Bushcricket
<i>Pseudotomias kisarawe</i> Hemp, 2016	Coastal False-leaf
<i>Pseudotomias usambaricus</i> Hemp, 2016	Usambara False-leaf
<i>Stenampyx viridiflavus</i> Hemp, 2020	East African Short Tushy
<i>Zabalius ophthalmicus</i> (Walker, 1869)	East African Zabalius

### False-Leaf Bushcrickets

### Anostomatidae

<i>Libanasa brachyura</i> Karny, 1928	East Africa Weta
<i>Libanasa kilomeni</i> Hemp & Johns, 2015	Pare Weta
<i>Nasidius</i> sp.	Big Face Weta

### Wetas or King Crickets

### Gryllacrididae/Gryllacridinae

<i>Afroepacra kuhlgatzi</i> Griffini, 1912	Kuhlgatz ' Afroepacra
<i>Afroneanias scheffleri</i> (Griffini, 1908)	Scheffler 's Raspy Cricket
<i>Ametroides kibonotensis</i> (Sjöstedt, 1910)	Kibonoto Flightless Raspy Cricket
<i>Ametroides nigrifacies</i> (Sjöstedt, 1910)	Three-dotted Flightless Raspy Cricket
<i>Ametroides innotatus</i> Karny, 1929	Coastal Flightless Raspy Cricket
<i>Atychogryllacris holdhausi</i> (Griffini, 1912)	Holdhaus ' Short-winged Raspy Cricket
<i>Glomeremus falcifer</i> (Sjöstedt, 1910)	Inflated Flightless Raspy Cricket
<i>Glomeremus kilimandjaricus</i> (Sjöstedt, 1910)	Kilimanjaro Flightless Raspy Cricket
<i>Stictogryllacris kilimandjarica</i> (Sjöstedt, 1910)	Kilimanjaro Raspy Cricket
<i>Stictogryllacris meruensis</i> (Sjöstedt, 1910)	Meru Raspy Cricket
<i>Stictogryllacris vosseleri</i> (Griffini, 1908)	Vosseler 's Raspy Cricket
<i>Stictogryllacris fülleborni</i> (Griffini, 1908)	Fülleborn 's Raspy Cricket
<i>Stictogryllacris laetitiae</i> (Kirby, 1906)	Happy Raspy Cricket

### Raspy Crickets

## Family Tettigoniidae

### Subfamily Conocephalinae

#### Meadow and Cone-headed Bushcrickets

Conocephalinae are world-wide distributed and currently subdivided into five tribes of which the Agraeciini, Copiphorini, Euchenochophorini and Conocephalini have representatives in Africa. In Tanzania and Kenya species from three tribes are recorded.

#### Key to tribes, genera and species of East African Conocephalinae (males) (adapted from OSFO)

1	Fastigium width narrow, usually narrower than first antennal segment (scapus)	<b>Agraeciini</b>	<b>3</b>
1'	Fastigium width broader than scapus		<b>2</b>
2	Fastigium elongated into cone	<b>Copiphorini</b>	<b>4</b>
2'	Fastigium not significantly elongated	<b>Conocephalini</b>	
3	Tegmina almost fully covered by pronotum, reduced, alae absent	<b>Afroanthracites</b>	
3'	Tegmina not covered by pronotum, shortened or fully developed, alae present		<b>6</b>
4	Fastigium elongated into long process		<b>5</b>
4'	Fastigium with short process	<b>Ruspolia</b>	
5	Elongated part of fastigium stout, about half the length of head	<b>Lanista varelei</b>	
5'	Elongated part of fastigium more slender almost as long as head	<b>Pseudorhynchus pungens</b>	
6	Fastigium verticis blunt, almost rectangular	<b>Dendrobia</b>	
6'	Fastigium verticis conical	<b>Afroagraecia</b>	



Fig. Agr 1. Female **Short-winged Afroagraecia**, one of the species with shortened tegmina.

## Tribe Agraeciini

The African Agraeciini are represented with three genera in the area, *Afroanthracites*, *Afroagraecia*, and *Dendrobia*.

### Genus *Afroagraecia* *Afroagraecias*

The genus *Afroagraecia* contains 13 species, 12 occur in the area, one short-winged species was recently described from Mozambique. They

are divided into two groups: the short-winged species *A. brachyptera*, *A. bloyeti*, *A. panteli* and *A. flava* occurring in inland Tanzania and the long-winged species *A. sansibara*, *A. jozani*, *A. furcata*, *A. pwanina*, *A. kisarawe*, *A. shimbaensis*, *A. mangula*, and *A. nguruensis* all occurring in lowland wet forests except for *A. nguruensis*.

**Identification:** Medium-sized insects of light brown to dark brown colour with a triangle-shaped dark fascia on the face and a dark broad fascia on dorsum of head and pronotal disc in most species. Tegmina and alae shortened, as long as the abdomen or slightly longer. The female ovipositor is long and slender and only slightly up-curved.

#### Key to the species of *Afroagraecia* (males)

1	Tegmina shortened, not surpassing abdominal segment 4	2
1'	Tegmina surpassing abdominal segment 4, about body length or longer	6
2	Tegmina not surpassing abdominal tergite 2	4
2'	Tegmina surpassing abdominal tergite 2	3
3	Face uniformly coloured, without fascia. Tegmina reaching abdominal tergite 4; Udzungwa Mountains	<i>A. flava</i>
3'	Face with dark fascia; Kilimanjaro and northern part of Eastern Arc Mts	<i>A. brachyptera</i>
4	Tegmina almost reaching posterior margin of abdominal tergite 1; fascia of face well-developed to obsolete	5
4'	Tegmina about half of length of abdominal tergite 1. Fascia of face well-developed; Mozambique	<i>A. muagurai</i>
5	Apical two spines of male cerci slender and of equal length. Central Tanzania	<i>A. panteli</i>
5'	Male cerci with one apical spine and two stout subapical ones. Tanzania, Kondo	<i>A. bloyeti</i>
6	Tegmina longer than body length. Face with faint or without fascia; Shimba Hills	<i>A. shimbaensis</i>
6'	Tegmina about body length or slightly shorter	7
7	Head and pronotum with pitch black fascia; Zanzibar	<i>A. jozani</i>
7'	Head and pronotum with brown to dark brown or without fascia	8
8	Face without fascia; Kazimzumbwi Forest Reserve	<i>A. furcata</i>
8'	Face with dark brown fascia	9
9	Cerci at base with long and slender inner process; East Usambara and coast	<i>A. pwanina</i>
9'	Cerci at base with short spine or dent or finger-like process or process lacking	10
10	Cerci at base with acute process; Udzungwa Mts	<i>A. mangula</i>
10'	Cerci at base not acute but with rounded apex	11
11	Cerci at base with finger-like, thin process; Nguru Mts	<i>A. nguruensis</i>
11'	Cerci at base with stout process	12
12	Cerci at base with stout process or process lacking; small body size; Kazimzumbwi Forest Reserve	<i>A. kisarawe</i>
12'	Cerci at base with stout process; larger body size; Zanzibar	<i>A. sansibara</i>

***Afroagraecia bloyeti***  
**Bloyet's Afroagraecia**

**Identification:** Medium-sized, uniformly light to medium brown. Tegmina and wings reduced to lobes, reaching to posterior margin of abdominal tergite 1.

**Biology:** Night active, predaceous.

**Habitat:** Miombo woodlands and dry deciduous forests.

**Distribution:** Known only from the type locality Kondoia in central Tanzania.

***Afroagraecia brachyptera***  
**Short-winged Afroagraecia**

**Identification:** Medium-sized (body length 2.3–2.7 cm), uniformly light to medium brown, dorsally with a median dark to black fascia from head over the entire disc of the pronotum and a black triangle on the face. Tegmina and wings shortened, reaching to the posterior margin of abdominal tergite 2 or slightly surpassing it.

**Biology:** Night active, predaceous. Seasonal species present during the warm period of the year from approximately October to April/May.

**Song:** Long series of syllables or of pairs of syllables, mostly in the ultrasonic range.

**Habitat:** Submontane bushland and home gardens in the submontane zone and deciduous dry forest.

**Distribution:** Northern Tanzania. Kilimanjaro, North and South Pare Mountains.



**Fig. Agr 2.** Face of **Short-winged Afroagraecia** with a black triangle-shaped fascia, typical for most *Afroagraecia* species.



**Fig. Agr 3.** Male **Short-winged Afroagraecia** known from a few localities in northern Tanzania.

***Afroagraecia flava***  
**Yellow Afroagraecia**

**Identification:** Comparatively large with an overall yellow colour. Face uniformly yellowish to tawny. Tegmina abbreviated, reaching to about abdominal segment 4.

**Biology:** Night active, predaceous.

**Habitat:** Montane forest.

**Distribution:** Known only from the holotype in the Gologolo Mts of the Udzungwa Mountains National Park in Tanzania.



**Figs. Agr 4 & 5.** Face of the **Yellow Afroagraecia** (above) and lateral view on male (left), the only known specimen of this species so far. The Gologolo Mts were screened several times for this species but without the success of obtaining more specimens.

***Afroagraecia furcata***  
**Forked Afroagraecia**

**Identification:** Beside *Afroagraecia jozani* the only species with forked male cerci.

**Biology:** Night active, predaceous.

**Habitat:** Coastal forest.

**Distribution:** Only known from Kazimzumbwi Forest Reserve near Dar es Salaam.

**Conservation status:** Critically endangered.

**Remarks:** *A. furcata* and *A. jozani* are morphological sister pairs and a result of a spread of a common ancestor from mainland Africa to Zanzibar during times when Zanzibar had connection via land bridges with the mainland.

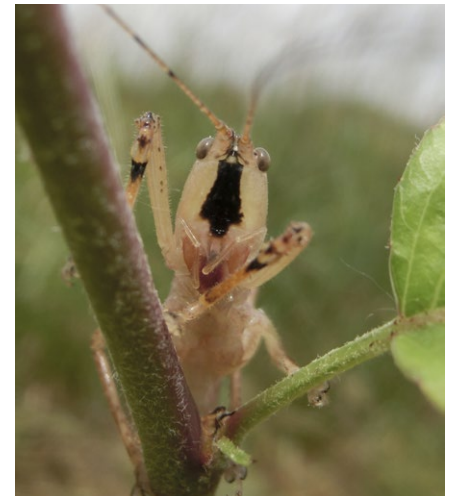
***Afroagraecia jozani***  
**Jozani Afroagraecia**

**Identification:** Sister species to *A. furcata* on the mainland. Differentiated from *A. furcata* by more thorns or dents on the male cerci. Easily recognized by its pitch black fascia on head and abdomen and a black fascia on the face. *A. furcata* has a light brown often obsolete fascia on head and pronotum and no fascia on the face.

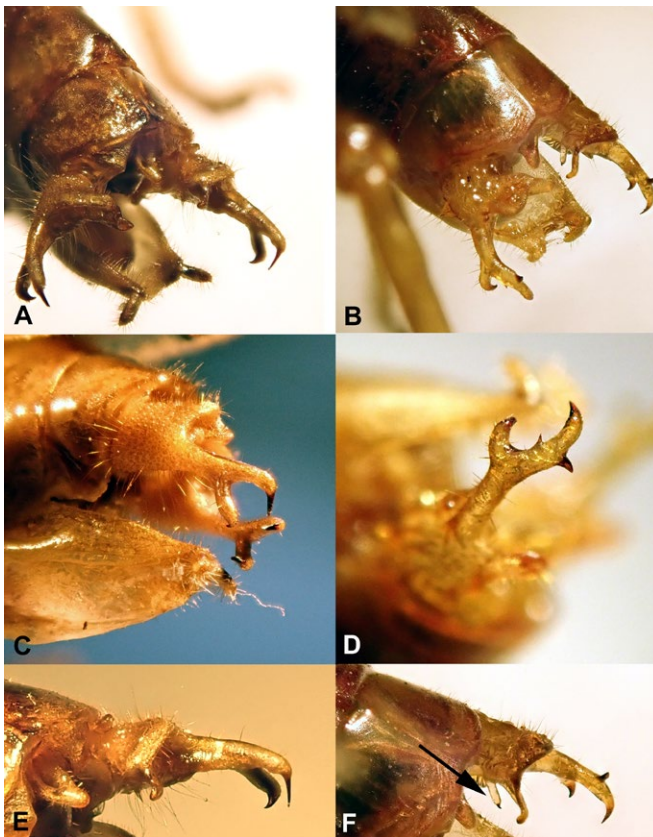
**Biology:** Night active, predaceous.

**Habitat:** Coastal forest.

**Distribution:** Known only from Jozani Forest National Park on Zanzibar but very likely more widespread on Zanzibar in suitable habitats.



**Figs. Agr 6 & 7.** Female **Jozani Afroagraecia** restricted to Zanzibar. The right image shows the face of the **Jozani Afroagraecia** with the black fascia. It occurs together with the **Zanzibar Afroagraecia** in Jozani Forest National Park and can be distinguished from the latter species by its pitch black fascia on head and pronotum and the forked male cerci.



**Fig. Agr 8.** Male apices of *Afroagraecia jozani* (**A, C, E**) and *A. furcata* (**B, D, F**). *A. jozani* has forked male cerci, the outer branch acute and sclerotized while *A. furcata* has shorter branches and additional dents on the outer branch. Further an inner process at the base of the male cerci is present in *A. furcata* (arrow in **F**) lacking in *A. jozani*.

***Afroagraecia kisarawe***  
**Kisarawe Afroagraecia**

**Identification:** Comparatively small *Afroagraecia* species, uniformly light to medium brown, dorsally with a median dark to black fascia from head over the entire disc of the pronotum and a black triangle on the face. Tegmina and wings about as long as body length or slightly shorter. Very similar to the **Zanzibar Afroagraecia** which is slightly larger.

**Biology:** Night active, predaceous.

**Song:** Long series of syllables or of pairs of syllables, mostly in the ultrasonic range.

**Habitat:** In understory vegetation of lowland wet forest, probably all year round.

**Distribution:** At present only known from the type locality, Kazim-zumbwi Forest Reserve, Kisarawe District near Dar es Salaam.

**Conservation status:** Critically endangered.



**Fig. Agr 9.** Female **Kisarawe Afroagraecia**.





**Fig. Agr 10.** Male **Kisarawe Afroagraecia**, the species is at present only known from Kazimzumbwi Forest Reserve near Kisarawe.



**Fig. Agr 11.** Face of **Kisarawe Afroagraecia** with a triangle-shaped dark fascia.

***Afroagraecia mangula***  
**Udzungwa Afroagraecia**

**Identification:** Comparatively large *Afroagraecia* species. Tegmina shorter than body length and often with a slight greenish tinge. With a typical triangular-shaped dark marking on the face and dark fascia on the pronotum.

**Biology:** Night active, predaceous. Seasonal species, adults present from about December to February/March.

**Song:** Long series of syllables or of pairs of syllables, fully in the ultrasonic range.

**Habitat:** In understory vegetation of lowland wet forest.

**Distribution:** Tanzania, Udzungwa Mountains.



**Fig. Agr 12** (above, right). Male **Udzungwa Afroagraecia**.  
**Fig. Agr 13** (below). Female **Udzungwa Afroagraecia**. This species occurs in the same habitat as **Pantel's Afroagraecia** but at a different time of the year.





**Figs. Agr 14–16** (clockwise). Male *Nguru Afroagraecia*, female and face of male.



***Afroagraecia nguruensis***  
**Nguru *Afroagraecia***

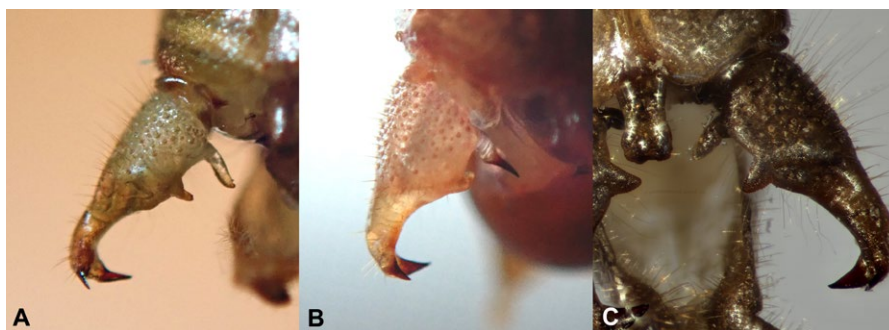
**Identification:** Species with the wings shorter (males) or about body length (females) with a faint median fascia on the head and the pronotum and a dark fascia on the face.

**Biology:** Night active, predaceous.

**Song:** Long series of syllables or of pairs of syllables, fully in the ultrasonic range.

**Habitat:** Submontane forest.

**Distribution:** Only known from the Nguru Mountains at present.



**Fig. Agr 17.** Male cerci of *A. nguruensis* (A), *A. mangula* (B), and *A. kisarawe* (C) showing morphological differences. Except for these differences, the three species are very similar to each other having long tegmina, fasciae on the face and head, and pronotum.



**Fig. Agr 18.** Pantel's *Afroagraecia*, male from the Uluguru Mountains.



**Fig. Agr 19.** Male Pantel's *Afroagraecia* from the Nguru Mountains. The Nguru population is almost uniformly tawny without any black markings and has slightly different male cerci.

### ***Afroagraecia panteli*** **Pantel's *Afroagraecia***

**Identification:** Small and fragile for *Afroagraecia*, uniformly light to medium brown. Tegmina and wings reduced but with broader lobes than *A. bloyeti*, reaching to posterior margin of abdominal tergite 1. Fascia on the face – if present – is narrow and almost rectangular.

**Biology:** Night active, predaceous. Seasonal species. Adults from March onwards.

**Song:** Continuous syllables in the ultrasonic range.

**Distribution:** Tanzania. Described from the Ukami Mountains of Tanzania. Re-collected from the Udzungwa Mountains National Park, the Uluguru and Nguru Mountains.

**Remarks:** There are slight morphological differences between the populations on the different mountain ranges.



**Fig. Agr 20. Pantel's Afroagraecia**, female. The species was originally described from the Ukami Mountains which are deforested today. Specimens of **Pantel's Afroagraecia** were caught in the Udzungwa Mountains National Park near the Headquarters at Mangula, in the Uluguru Mountains near Morogoro and the Nguru Mountains above Turiani. Specimens from these localities differ slightly in their colour pattern. The recently described *A. muagurui* from Sofala in Mozambique has a similar fragile habitus and very short tegmina but a dark mottled colour pattern. Only females are known at present from this species which morphologically is related to *A. panteli* and *A. bloyeti*.

**Fig. Agr 21. Face of Pantel's Afroagraecia**; female from the Uluguru Mountains.



**Fig. Agr 22.** Face of **Pantel's Afroagraecia** from the Udzungwa Mountains showing a slightly different pattern on the face compared to specimens coming from the Uluguru Mountains.



**Fig. Agr 23.** Male **Coastal Afroagraecia** from Amani Nature Reserve in the East Usambara Mountains. The population here has tegmina shorter than the body length and the tegmina of the males have often a bluish tinge.

***Afroagraecia pwanja***  
**Coastal Afroagraecia**

**Identification:** Comparatively large *Afroagraecia* species, uniformly light to medium brown, dorsally with a median dark to black fascia from the head over the entire disc of the pronotum and a black triangle on the face. Tegmina and wings about as long as body length, sometimes slightly longer, often with a greenish or bluish tinge.

**Biology:** Night active, predaceous.

**Song:** Long series of syllables or of pairs of syllables, fully in the ultrasonic range.

**Habitat:** In understory vegetation of coastal and lowland to sub-montane forest.

**Distribution:** Recorded from the West and East Usambara Mountains and the Tanzanian coast between Tanga and Pangani.

**Conservation status:** Vulnerable.



**Fig. Agr 24.** Male **Coastal Afroagraecia** from the Nilo Forest Reserve in the East Usambara Mountains. The population there is predominantly brown with a well-developed dark fascia on head and pronotum but also individuals with a greenish tinge on the tegmina are common.



Fig. Agr 25. Female **Coastal Afroagraecia** from the Nilo Forest Reserve with slightly longer tegmina and a greenish tinge.

***Afroagraecia shimbaensis***  
**Shimba Hills Afroagraecia**

**Identification:** Medium-sized (body length 2.4–2.5 cm), uniformly light to medium brown. Fascia on head and pronotum absent or faint, face uniformly brown. Tegmina and wings surpass body apex.

**Habitat:** Probably understory vegetation of lowland forest.

**Distribution:** Known at present only from museum specimens collected in the Shimba Hills of Kenya.

***Afroagraecia sansibara***  
**Zanzibar Afroagraecia**

**Identification:** Medium-sized, uniformly light to medium brown. Tegmina and wings shorter (males) or slightly longer (females) than body length.

**Biology:** Night active, predaceous.

**Habitat:** Coastal bush and forest.

**Distribution:** Tanzania, Zanzibar.

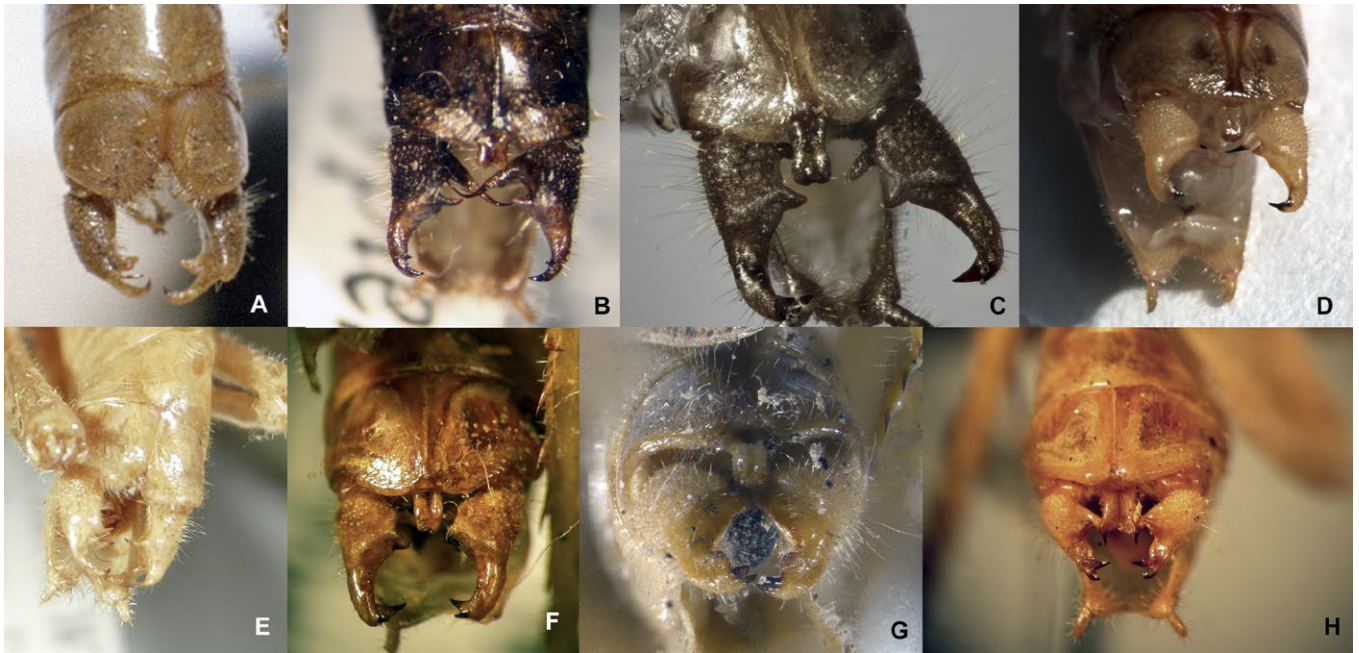
**Conservation status:** Vulnerable.



Figs. Agr 26–28. Male Zanzibar *Afroagraecia* (*A. sansibara*).







**Fig. Agr 29.** Male *Afroagraecia* abdominal apices. **A.** Bloyet's *Afroagraecia* (*A. bloyeti*) **B.** Short-winged *Afroagraecia* (*A. brachyptera*) **C.** Kisarawe *Afroagraecia* (*A. kisarawe*) **D.** Udzungwa *Afroagraecia* (*A. mangula*) **E.** Pantel's *Afroagraecia* (*A. panteli*) **F.** Coastal *Afroagraecia* (*A. pwanja*) **G.** Zanzibar *Afroagraecia* (*A. sansibara*) **H.** Shimba Hills *Afroagraecia* (*A. shimbaensis*).

**Fig. Agr 30.** Abdominal apices of the **Zanzibar *Afroagraecia*** (**A.**, *A. sansibara*, left) and the **Kisarawe *Afroagraecia*** (**B.**, *A. kisarawe*, right). Both species are very similar. However, there are slight morphological differences in the male cerci. The **Zanzibar *Afroagraecia*** has a conspicuous second process basally at the inner side of the cercus while the **Kisarawe *Afroagraecia*** mostly has a blunt knob or a short rounded process at this place (arrows). The **Zanzibar *Afroagraecia*** is also slightly larger than the **Kisarawe *Afroagraecia***.





Fig. Agr 31. Distribution map of *Afroagraecia* species.

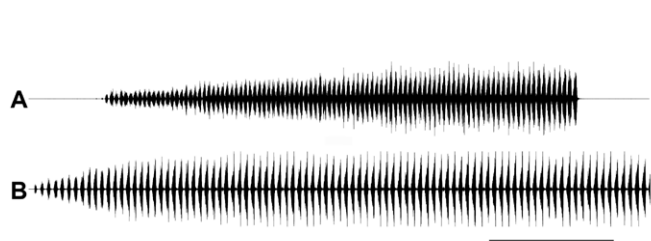
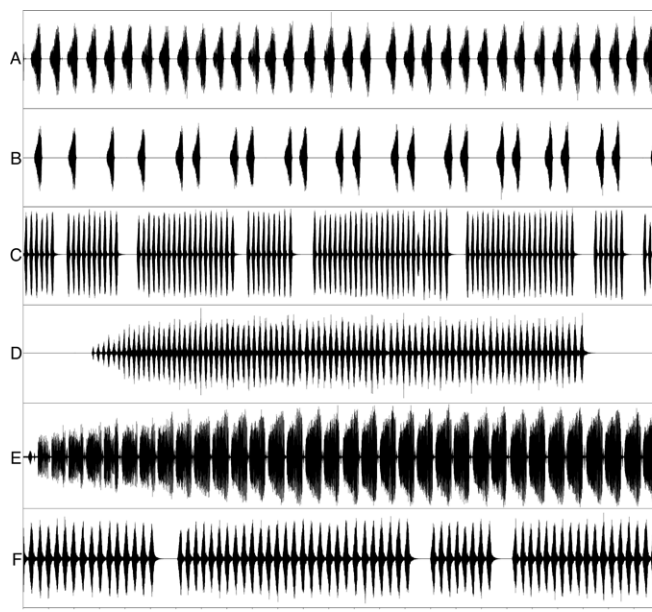


Fig. Agr 32. Song patterns of *Afroagraecia flava* (A) and *A. nguruensis* (B). Scale bar 1 s.

Fig. Agr 33. Song patterns of *Afroagraecia* species.  
**A, B. Short-winged *Afroagraecia* (*A. brachyptera*)** variation of song  
**C. Kisarawe *Afroagraecia* (*A. kisarawe*)**  
**D. Udzungwa *Afroagraecia* (*A. mangula*)**  
**E. Pantel's *Afroagraecia* (*A. panteli*)**  
**F. Coastal *Afroagraecia* (*A. pwania*).**  
 Scale bar 1 s.



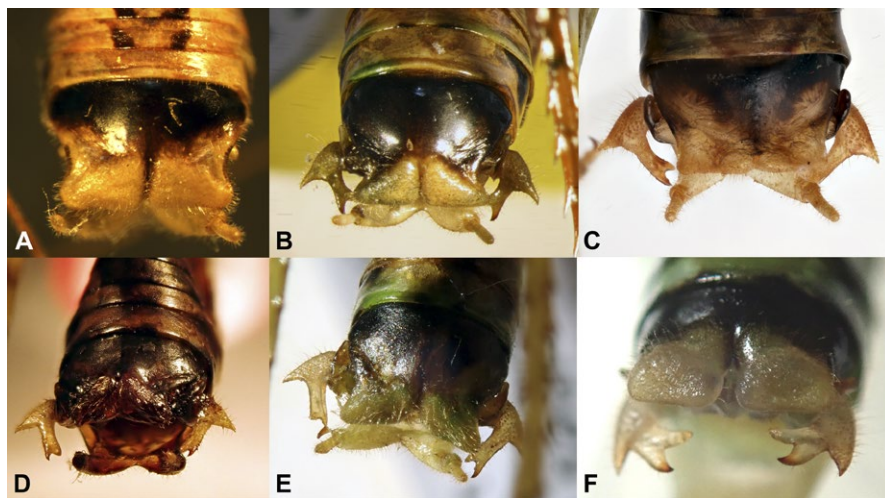
## Genus *Afroanthracites*

### *Afroanthracites*

The genus *Afroanthracites* currently contains 16 species of which most species are restricted to the ranges of the Eastern Arc Mountains in Kenya and Tanzania.

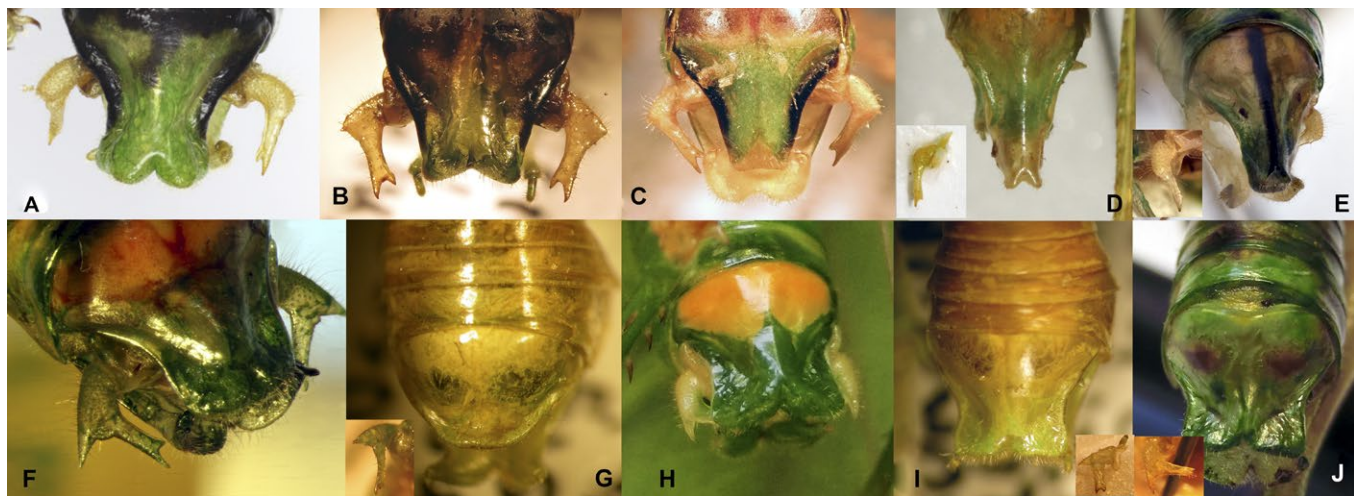
**Identification:** Medium-sized insects with either a pattern of mottled brown, black and green and a brown patch on the pronotal disc, green

with yellow or predominantly green or conspicuously coloured in red-brown, black and green. Males of all *Afroanthracites* species are microp-terous, with reduced tegmina which are short rounded lobes completely covered by the pronotum. The 10<sup>th</sup> abdominal tergite in males is shield-like and broad with an evenly curved posterior margin or broad at its base and posteriorly elongated and curved downwards. The posterior margin is rounded or differentiated into lobes. The male cerci are mostly hidden under the 10<sup>th</sup> abdominal tergite. Females are similar to the males, with a long (about half the length of the body) but stout ovipositor.



**Fig. Agr 34.** Apices of male *Afroanthracites* species forming one morphological lineage:

- A. Colourful *Afroanthracites*** (*A. discolor*) Mazumbai Forest Reserve, W Usambara  
**B. Lutindi Colourful *Afroanthracites*** (*A. pseudodiscolor*) Lutindi Forest, W Usambara  
**C. North Pare *Afroanthracites*** (*A. guttatus*), North Pare  
**D. South Pare *Afroanthracites*** (*A. maculatus*), South Pare  
**E. Magamba *Afroanthracites*** (*A. magamba*), Magamba Forest Reserve, W Usambara  
**F. Pommer's *Afroanthracites*** (*A. pommeri*), Taita Hills.



**Fig. Agr 35.** Apices of male *Afroanthracites* **A. Montane *Afroanthracites*** (*A. montium*), Mts Kilimanjaro and Meru **B. Unexpected *Afroanthracites*** (*A. inopinatus*), South Pare **C. West Usambara *Afroanthracites*** (*A. usambaricus*), W Usambara **D. Jago's *Afroanthracites*** (*A. jagoi*), Mazumbai Forest Reserve, W Usambara **E. Striped *Afroanthracites*** (*A. lineatus*), Lutindi Forest Reserve, E Usambara **F. Lutindi *Afroanthracites*** (*A. lutindi*), Lutindi Forest, W Usambara **G. Green *Afroanthracites*** (*A. viridis*), E Usambara **H. Nguru *Afroanthracites*** (*A. nguru*), Nguru Mts **I. Uluguru *Afroanthracites*** (*A. uluguruensis*), Uluguru Mts **J. Udzungwa *Afroanthracites*** (*A. ngologolo*), Udzungwa Mts. Insets: right or left cercus.

**Key to the species of *Afroanthracites* (males)**

<b>1</b>	Face with dark fascia	<b>2</b>
<b>1'</b>	Face without dark fascia	<b>6</b>
<b>2</b>	Black fascia of face bordered white	<b>3</b>
<b>2'</b>	Black fascia of face not bordered white	<b>5</b>
<b>3</b>	Male cerci strongly laterally compressed. Kenya, Taita Hills	<b><i>A. pommeri</i></b>
<b>3'</b>	Male cerci not as strongly laterally compressed. Tanzania	<b>4</b>
<b>4</b>	Metazona of pronotum narrow, 4.3–4.9 mm. South Pare Mts	<b><i>A. maculatus</i></b>
<b>4'</b>	Metazona of pronotum wide, 5.5–5.8 mm. West Usambara	<b><i>A. magamba</i></b>
<b>5</b>	Fascia of face obsolete or same colour as face or reduced to darker brown patch	<b><i>A. discolor</i></b>
<b>5'</b>	Fascia of face distinct, black or dark brown. North Pare Mts	<b><i>A. guttatus</i></b>
<b>6</b>	Scapi and upper part of face black, lower part of face green	<b>7</b>
<b>6'</b>	Face and area around scapi uniformly coloured	<b>9</b>
<b>7</b>	10 <sup>th</sup> abdominal tergite with elevated median ridge	<b>8</b>
<b>7'</b>	10 <sup>th</sup> abdominal tergite without median elevated ridge. West Usambara Mts	<b><i>A. usambaricus</i></b>
<b>8</b>	10 <sup>th</sup> abdominal tergite with strongly elevated median ridge. Mts Kilimanjaro and Meru	<b><i>A. montium</i></b>
<b>8'</b>	10 <sup>th</sup> abdominal tergite with weak median ridge. South Pare Mts	<b><i>A. inopinatus</i></b>
<b>9</b>	Face uniformly dark brown. West Usambara Mts	<b><i>A. pseudodiscolor</i></b>
<b>9'</b>	Face green or tawny	<b>10</b>
<b>10</b>	10 <sup>th</sup> abdominal tergite strongly elongated	<b>11</b>
<b>10'</b>	10 <sup>th</sup> abdominal tergite not strongly elongated	<b>12</b>
<b>11</b>	10 <sup>th</sup> abdominal tergite very narrow, green; apex with two small lobes. West Usambara Mts	<b><i>A. jagoi</i></b>
<b>11'</b>	10 <sup>th</sup> abdominal tergite not as narrow, with black median stripe; ending in blunt up-lifted tip. East Usambara Mts	<b><i>A. lineatus</i></b>
<b>12</b>	10 <sup>th</sup> abdominal tergite shield-like, broad. East Usambara Mts	<b><i>A. viridis</i></b>
<b>12'</b>	10 <sup>th</sup> abdominal tergite not shield-like, differentiated at posterior margin into two lobes	<b>13</b>
<b>13</b>	Posterior margins of tegmina black. Udzungwa Mts	<b><i>A. ngologolo</i></b>
<b>13'</b>	Posterior margins of tegmina of same colour as tegmina	<b>14</b>
<b>14</b>	Posterior margin of 10 <sup>th</sup> abdominal tergite straight, lobes only indicated by shallow median incision. Uluguru Mts	<b><i>A. uluguruensis</i></b>
<b>14'</b>	Posterior margin of 10 <sup>th</sup> abdominal tergite forming two lobes. Nguru Mts	<b><i>A. nguru</i></b>



**Fig. Agr 36.** Male **Colourful Afroanthracites**. The species is known at present only from the Mazumbai Forest Reserve in the West Usambara Mountains.

***Afroanthracites discolor***  
**Colourful Afroanthracites**

**Identification:** Medium-sized (body length 2.2–2.5 cm) but comparatively large for *Afroanthracites*, with a conspicuous colour pattern of hazelnut brown on the pronotum, a vivid green abdomen with triangle-shaped brown and black structures medially. With a dark triangle-shaped fascia on the face. The last abdominal tergite is divided into two broad lobes, the anterior part black while the posterior part is whitish.

**Biology:** Night active species, feeding on seeds and insects.

**Song:** Song produced at night, consisting of long series of clearly audible pairs of syllables.

**Habitat:** Recorded in the montane zone in understory vegetation of forest and in hedges and bushes fringing the forest.

**Distribution:** Endemic to the West Usambara Mountains, Tanzania.

**Conservation status:** Endangered.



**Fig. Agr 37.** Male **Colourful Afroanthracites** showing the long antennae typical for all *Afroanthracites* species.

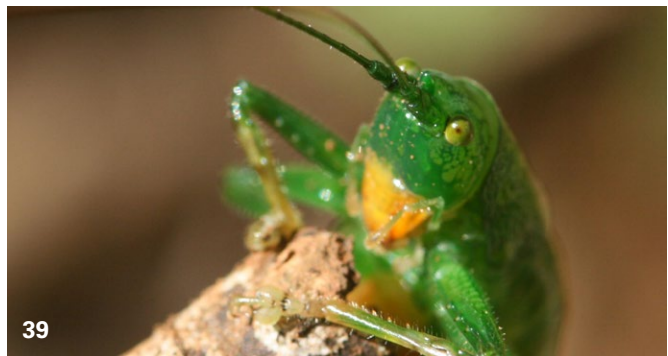
***Afroanthracites jagoi***  
**Jago's Afroanthracites**

**Identification:** Medium-sized (body length 2.2 cm), smaller than most other *Afroanthracites* species. Colour pattern green with a white posterior part of pronotal disc and eyes, part of the face, venter of abdomen and anterior part of last abdominal tergite brightly orange. Prosternum with two u-shaped spines. 10<sup>th</sup> abdominal tergite long, strongly narrowed towards apex, its posterior margin incised, forming two very narrow lobes.

**Song:** Produced at night, fully in the ultrasonic range.

**Distribution:** Tanzania, West Usambara Mountains. Only known from Mazumbai Forest Reserve. The same or a very closely related species was found in Magamba Forest Reserve in the West Usambaras (one female only at present).

**Conservation status:** Endangered.



**Fig. Agr 38** (above right). **Jago's Afroanthracites**, female.

**Fig. Agr 39** (middle right). **Face of Jago's Afroanthracites.**

The upper side is completely green while the lower side with clypeus and mandibles is orange.

**Fig. Agr 40.** **Jago's Afroanthracites**, male. The white area of the posterior part of the pronotum is larger and more brightly white than in females.

