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OVERVIEW OF FOREST PESTS

SUDAN

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DISCLAIMER

The aim of this document is to give an overview of the forest pest¹ situation in the Sudan. It is not intended to be a comprehensive review.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

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¹ Pest: Any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products (FAO, 2004).

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Background

This paper is one of a series of FAO documents on forest-related health and biosecurity issues. The purpose of these papers is to provide early information on on-going activities and programmes, and to stimulate discussion.

In an attempt to quantify the impacts of the many factors that affect the health and vitality of a forest, the Global Forest Resources Assessment 2005 (FRA 2005) asked countries to report on the area of forest affected by disturbances, including forest fires, insects, diseases and other disturbances such as weather-related damage. However, most countries were not able to provide reliable information because they do not systematically monitor these variables.

In order to obtain a more complete picture of forest health, FAO continues to work on several follow-up studies. A review of forest pests in both naturally regenerating forests and planted forests was carried out in 25 countries representing all regions of the world. This *Overview of forest pests* represents one paper resulting from this review. Countries in this present series include Argentina, Belize, Brazil, Chile, China, Cyprus, Colombia, Ghana, Honduras, India, Indonesia, Kenya, Kyrgyz Republic, Malawi, Mauritius, Mexico, Moldova, Mongolia, Morocco, South Africa, Sudan, Thailand, Romania, Russian Federation, Uruguay; this list will be continuously updated.

Comments and feedback are welcome. For further information or if you are interested in participating in this process and providing information on insect pests, diseases and mammals affecting forests and the forest sector in your country, please contact:

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Acknowledgements

Information for the Sudan was compiled by G. Maynard and B. Moore.

SUDAN

Introduction

The country's forest cover is about 67 million hectares or approximately 28 percent of total land cover (FAO, 2006). Principal tree species include *Balanites aegyptiaca*, *Acacia* spp., *Anogeissus leiopocarpus*, *Albizia amara*, *Ziziphus spina-christi*, *Khaya senegalensis* and *Isoberlinia doka*. Planted forests cover approximately 5.404 million ha representing 8 percent of the total forest area (FAO, 2006).

Most of the wood production and sawmilling takes place in the riverine high-rainfall forest and savannah, confined to the central part of the country, where most of the population lives. Timber is produced from naturally regenerating forests and plantations, particularly teak, mahogany and *Acacia nilotica* (known locally as sunt). The savannah zones suffer from large-scale tree clearance, repeated floods during the rainy season, erosion, fierce late-season fires and sometimes conflicts between nomadic herders and farmers.

Little information is available about insects and diseases impacting forests and the forest sector in Sudan. One report, however, estimated that 102 874 km² of forested areas in four states – Darfur, Kordofan, Eastern and Central – were affected by insect pests and diseases (FAO, 2005).

Forest pests and diseases

Naturally regenerating forests

Insects

Indigenous insects

***Anacridum melanorhodon* (Walker, 1870)**

Other scientific names: *Schistocerca exsul*

Orthoptera: Acrididae

Common names: Sahelian tree locust; Sudan tree locust; night wanderer

Host type: broadleaf

Hosts: *Acacia senegal*; *Balanites aegyptica*

Anacridum melanorhodon is a large grasshopper that occurs in the savannahs and wooded steppes of northeastern, central and West Africa and the Near East. It feeds on leaves and the young green parts of plants and has a broad host range. It is a serious pest of natural and planted forests. In Sudan, it occurs mainly in the central, northern and western areas where it damages *Acacia senegal*, *Balanites aegyptica*, fruit trees and agricultural crops. This insect occasionally causes widespread defoliation and significantly reduces gum arabic production from *A. senegal*.

At times, *A. melanorhodon* occurs in dense, dark swarms. The adults fly in scattered swarms at night or early in the morning, hence the name night wanderer. During the day

it often roosts in trees, hence the name tree locusts. This species has one generation per year; breeding starts during the rainy season. The dry season is spent in the adult stage.

<http://www.fao.org/docrep/008/v5020e/V5020E00.htm>

http://locust.cirad.fr/principales_especes/ana_en.html

***Sphenoptera chalcichroa arenosa* Obenberger, 1924**

Other scientific names: *Heteropsylla incisa* (Sulc.)

Coleoptera: Buprestidae

Common names: silver tree borer

Host type: broadleaf

Hosts: *Acacia nilotica*; *Betula allegheniensis*

Sunt, *Acacia nilotica*, is the most valuable timber-producing species in northern Sudan. It contributes an estimated 40-50 percent to the total sawn timber production in northern Sudan and 10-15 percent to fuelwood production (El Atta and Abdel Nour, 1995). The timber is used for railway sleepers, heavy construction, turnery, boat-building, fuelwood and tanning material from the bark and pods. The tree occurs in pure, even age stands which have been artificially regenerated by direct seeding in flood plains and remnants of oxbow lakes along the Nile and its tributaries. Along the Blue Nile and its tributaries, *A. nilotica* plantations are managed on 20 or 30 year rotations.

Dieback of *Acacia nilotica* was reported in the Sudan as early as the 1930s and was attributed to infestation by *Sphenoptera chalcichroa arenosa*, a cambium and wood-boring beetle (El Atta and Abdel Nour, 1995). The larvae of this beetle tunnel into the cambium layer of branches and stems causing dieback and gradual tree mortality.

A study conducted in Lembwa Forest (Blue Nile) looked at the effects of the larvae on the diameter at breast height (dbh at 1.3 m), tree height, volume and the mean annual increment of *A. nilotica*. Results showed that over a 4 year period, there was a 30 percent reduction in dbh, 21 percent decrease in height growth, 54 percent decrease in volume and 60 percent decrease in mean annual increment (El Atta and Abdel Nour, 1995).

By the early 1950s, the condition had affected most of the forests between Khartoum and Sennar and was estimated to have caused losses of up to 60 percent in the plantations along the Dinder River. The dieback was not reported south of Sennar Dam at that time. Its spread south had been cut off by complete clearing of *A. nilotica* in that area to provide fuel during dam construction (1914-1925). The forests south of the dam commence 15 km with a buffer area which was maintained clear of sunt. A legislative control measure strictly prohibited the transport of sunt wood upstream along the Blue Nile from Sennar and Dinder. It was believed that this action contained the dieback up to 1978 when it appeared in the Hedaibat Forest on the west bank of the Blue Nile and the Wad Behaiga Forest on the eastern bank, some 90 km south of Sennar. In 1989 it suddenly erupted reaching plague proportions. Fourteen reserves have been affected with a total area of 500 ha affected with 15 percent of the *A. nilotica* area in the reserves being killed (El Atta and Abdel Nour, 1995).

<http://www.fao.org/docrep/008/v5020e/V5020E05.htm#04.7>

***Sphenoptera fulgens* Gory, 1842**

Other scientific names:

Coleoptera: Buprestidae

Common names: root-boring beetle

Host type: broadleaf

Hosts:

http://jcringenbach.free.fr/website/beetles/buprestidae/Sphenoptera_fulgens.htm

Introduced insects

No information was found for introduced insects impacting Sudan's naturally regenerating forests.

Diseases

Indigenous diseases

Xanthomonas axonopodis p.v. *khayae* (Sabet, 1959) Vauterin, Hoste, Kersters & Swings, 1995

Other scientific names: *Xanthomonas campestris* p.v. *khayae* (Sabet, 1959) Dye, 1978

Bacteria

Common names: leaf spot

Host type: broadleaf

Hosts: *Khaya senegalensis*

Xanthomonas axonopodis p.v. *khayae* causes damage to the leaves of *Khaya senegalensis* (mahogany) in the drier regions of Sudan (Bokkestijn and Francis, n.d).

Introduced diseases

No information was available on the status of introduced pathogens in the naturally regenerating forests of Sudan.

Other pests

Indigenous other pests

No information was available on the status of indigenous other pests (mites, nematodes, mammals, etc.) in the naturally regenerating forests of Sudan.

Introduced other pests

No information was available on the status of introduced other pests (mites, nematodes, mammals, etc.) in the naturally regenerating forests of Sudan.

Diebacks and other conditions

No records were available for diebacks and other conditions affecting Sudan's naturally regenerating forests.

Planted forests

Insects

Indigenous insects

***Bruchidius uberatus* (Fahraeus, 1839)**

Other scientific names:

Coleoptera: Bruchidae

Common names: seed beetle

Host type: broadleaf

Hosts: *Acacia* spp.; *A. nilotica*; *A. tortilis*; *A. mellifera*; *A. burkei*; *A. erioloba*; *A. robusta*

Bruchidius uberatus causes similar damage to *Caryedon serratus* however it is primarily a pest of stored seed (El Atta and Nour, 1995). The adults lay eggs on the pods, and then the larvae bore into the seed, often completely destroying the seed and hence preventing germination. If the pods or husks are removed then there is a significant reduction in infestation by this insect. In some places *Bruchidius uberatus* is the primary infesting insect of *Acacia nilotica*. It also infests a number of other *Acacia* species including *A. tortilis*, *A. mellifera*, *A. burkei*, *A. erioloba*, and *A. robusta*.

<http://www.fao.org/docrep/008/v5020e/V5020E00.htm>

<http://www.metla.fi/silvafennica/abs/sa34/sa344431.htm>

<http://www.dfsc.dk/pdf/Handbook/chapter7.pdf>

***Caryedon serratus* (Olivier, 1790)**

Other scientific names: *Bruchus gonagra*; *Bruchus serratus* Olivier; *Careydon sicutensis* (Pic); *Caryedon acaciae* auct.; *Caryedon fuscus* (Goeze); *Caryedon gonager* (Fabricius); *Caryedon gonagra* (Fabricius); *Caryedon languidus* Gyllenhal; *Caryoborus gonager* (Fabricius); *Caryoborus gonagra* (Fabricius); *Caryoborus serratus* (Olivier); *Pachymerus gonager* (Fabricius); *Pachymerus gonagra* (Fabricius); *Pachymerus serratus* Olivier; *Pachymerus sicutensis* Pic

Coleoptera: Bruchidae

Common names: seed beetle; tamarind seed weevil; peanut bruchid beetle; groundnut bruchid; tamarind weevil; groundnut borer

Host type: broadleaf

Hosts: *Acacia* spp.; *Cassia* spp.; *Tamarindus* spp.; *Bauhinia* spp.; *Arachis hypogaea*

Caryedon serratus attacks the seeds of a wide range of plants including *Acacia* spp., *Cassia* spp., *Tamarindus* spp., *Bauhinia* spp. and *Arachis hypogaea* (groundnuts). This species can also cause significant problems in the seeds of *Acacia* spp. The adults lay eggs on the pods and then the larvae bore into the seed, often completely destroying the seed and hence preventing germination. In projects where the native species *Acacia nilotica* has been used for regeneration in riverine forests along the Blue Nile, this seed beetle has caused significant problems. In these projects *A. nilotica* is planted in pure stands by direct seeding following harvesting. This beetle usually occurs at high infestation rates in stored seed; however the levels of infestation are lower in seeds on the forest floor and on standing trees.

<http://www.fao.org/DOCREP/006/Q4165E/Q4165E02.htm>

http://www.ento.csiro.au/aicn/name_s/b_870.htm

http://www.hear.org/starr/hiinsects/images/thumbnails/html/caryedon_serratus.htm

http://anic.ento.csiro.au/database/biota_details.aspx?BiotaID=41482

***Sphenoptera chalcichroa arenosa* Obenberger, 1924**

Other scientific names: *Heteropsylla incisa* (Sulc.)

Coleoptera: Buprestidae

Common names: silver tree borer

Host type: broadleaf

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<http://www.fao.org/docrep/008/v5020e/V5020E05.htm#04.7>

***Sphenoptera fulgens* Gory, 1842**

Other scientific names:

Coleoptera: Buprestidae

Common names: root-boring beetle

Host type:

Hosts:

http://jcringenbach.free.fr/website/beetles/buprestidae/Sphenoptera_fulgens.htm

Introduced insects

***Chrysobothris dorsata* (Fabricius, 1787)**

Other scientific names:

Coleoptera: Buprestidae

Common names: jewel beetle; mango bronze beetle

Host type: broadleaf

Hosts:

***Heteropsylla cubana* Crawford**

Other scientific names: *Heteropsylla incisa* (Sulc.)

Hemiptera: Psyllidae

Common names: Leucaena psyllid

Host type: broadleaf

Hosts: *Leucaena* spp.; *Leucaena leucocephala*; *Albizia* spp.; *Mimosa* spp.; *Samanea saman*

Heteropsylla cubana is a significant pest of *Leucaena leucocephala* in several regions of the world. It is native to Central and South America but has spread to Africa, Asia and the Pacific. *H. cubana* feeds on young growth and occasionally older growth and flowers. It causes dieback of terminal shoots and stunting. At times the damage can lead to defoliation and death of plants.

http://www.cifor.cgiar.org/publications/pdf_files/Insect-pests.pdf

<http://www.forestpests.org/subject.html?SUB=307>

http://www.ento.csiro.au/aicn/name_s/b_1961.htm

<http://www.afa.org/html/98-201.html>

[http://www.deh.gov.au/cgi-](http://www.deh.gov.au/cgi-bin/abrs/fauna/details.pl?pstrVol=PSYLLOIDEA;pstrTaxa=105;pstrChecklistMode=2)

[bin/abrs/fauna/details.pl?pstrVol=PSYLLOIDEA;pstrTaxa=105;pstrChecklistMode=2](http://www.deh.gov.au/cgi-bin/abrs/fauna/details.pl?pstrVol=PSYLLOIDEA;pstrTaxa=105;pstrChecklistMode=2)

Diseases

Indigenous diseases

No reports were available for indigenous diseases impacting Sudan's planted forests.

Introduced diseases

***Armillaria mellea* (Vahl) P. Kumm.**

Other scientific names: *Agaricus melleus* Vahl; *Agaricus sulphureus* Weinm.; *Armillaria mellea* var. *glabra* Gillet; *Armillaria mellea* var. *maxima* Barla; *Armillaria mellea* var.

minor Barla; *Armillaria mellea* var. *sulphurea* (Weinm.) Fr.; *Armillariella mellea* (Vahl) P. Karst.; *Clitocybe mellea* (Vahl) Ricken; *Lepiota mellea* (Vahl) J.E. Lange

Basidiomycota: Marasmiaceae

Common names: Armillaria root disease; honey mushroom; shoestring root rot

Host type: broadleaf

Hosts: *Tectona grandis*

Armillaria mellea is a common pathogen of trees, woody shrubs and some herbaceous plants, causing root, root-collar and butt rot. They invade trees through the bark of the major roots, progressively destroying the living root tissues and leading to serious decline and ultimate death of their hosts. Symptoms of infestation are premature autumn coloration and leaf drop, stunting of growth, yellowing or browning of the foliage, a general decline in the vigour of the plant, and twig, branch and main stem dieback. Such a decline usually occurs over several years but may appear to progress very quickly as the tree shows advanced symptoms of decline and death. As decline progresses, decay of the buttress roots and the lower trunk is evident. Small plants die quickly after the first symptoms appear with large trees surviving for a number of years. A severely infected tree also exudes resin, gum or a fermenting watery liquid from the lower trunk.

A. mellea is mainly a pathogen of broadleaved trees in ornamental parklands, natural woodlands, fruit orchards, etc, but it can kill young coniferous trees (pines, spruce, etc.) planted in sites where the broadleaved species were felled. In the Sudan, *A. mellea* is responsible for a 10-25 percent decrease in teak forests.

<http://www.forestryimages.org/browse/subimages.cfm?sub=821>

http://www.mykoweb.com/CAF/species/Armillaria_mellea.html

http://www.mushroomexpert.com/armillaria_mellea.html

http://web.aces.uiuc.edu/vista/pdf_pubs/602.pdf

<http://helios.bto.ed.ac.uk/bto/microbes/armill.htm>

***Natrassia mangiferae* (Syd. & P. Syd.) B. Sutton & Dyko (1989)**

Other scientific names: *Dothiorella mangiferae* Syd. & P. Syd. 1916

Ascomycota: Incertae sedis

Common names: Arbutus canker; blossom blight; soft brown rot; stem-end rot; apple branch wilt

Host type: broadleaf

Hosts: *Ficus carica*; *Juglans regia*; *Malus domestica*; *Citrus* spp.; *Morus alba*; *Prunus* spp.; *Mangifera* spp.; *Arbutus* spp.; *Eucalyptus* spp.

Natrassia mangiferae causes stem and branch dieback and blossom blight. It has a wide host range, occurring on many tropical plants and orchard trees including fig (*Ficus carica*), walnut (*Juglans regia*), apple (*Malus domestica*), *Citrus* spp., mulberry (*Morus alba*), *Prunus* spp., mango (*Mangifera* spp.), *Arbutus* spp. and *Eucalyptus* spp. Symptoms differ depending on the part of the tree affected. The disease is mostly documented to extend from the higher to lower parts of the tree (dieback). Cankers with external cracks are produced on stems and branches from which oozing exudates may be observed. Internal streaks extend through the stem where the bark is removed, indicating where the

fungus is situated. Asymptomatic trees can produce fruit which develop stem-end rot or soft brown rot after ripening.

<http://www.indexfungorum.org/Names/NamesRecord.asp?RecordID=126369>

<http://www.up.ac.za/academic/agrirural/old/mango/disease/sbr.html>

<http://www.cababstractsplus.org/DMPD/Reviews.asp?action=display&openMenu=relatedItems&ReviewID=16198&Year=2000>

Other pests

Indigenous other pests

No information was available on the status of indigenous other pests (e.g. mites, nematodes, mammals, etc.) in the planted forests of Sudan.

Introduced other pests

No information was available on the status of introduced other pests (e.g. mites, nematodes, mammals, etc.) in the planted forests of Sudan.

Diebacks and other conditions

No records were available for diebacks and other conditions affecting Sudan's planted forests.

Capacity for forest health protection

Government level

Virtually all forest land in Sudan is in public ownership. In 1989, the Central Forest Administration (CFA) was replaced by the Forests National Corporation (FNC). The FNC is autonomous, characterized by a clear organizational structure and defined functions, with a management board responsible to the Minister for Agriculture and Forestry. FNC retains the revenue it generates to use in performing its functions.

Monitoring and detection

Monitoring and detection of damaging insects and diseases generally consists of informal surveillance of forested areas by foresters and forest workers.

Data management

Much of the data on forest insects and diseases affecting forests in Sudan is qualitative in nature. However some estimates are available of overall areas affected by principal tree species. Data are also available on the impact of defoliation by tree locust or night wanderer on gum arabic production and the impact of seed weevils on seed production of *Acacia nilotica* (El Atta and Nour, 1995).

Pest management

Dehusking of *Acacia nilotica* seeds before storage will prevent attack by seed infesting beetles, particularly by *Bruchidius uberatus*, because it does not attack dehusked seed. Some botanical insecticides such as neem oil, castor oil or eucalyptus oil can provide effective control of seed beetles.

Control of tree locust or night wanderer is limited to ground or aerial spraying. This work is usually done by the Plant Protection Department of the Ministry of Agriculture, Food and Natural Resources.

Cultural practices conducive to growing healthy trees are the first defence against termite attack. These include weeding, thinning, terrace management and timely irrigation when possible. However, since most planted forests are rain fed and with periodic droughts, cultural practices may be insufficient to prevent attack. Application of termiticides to the potting medium in the nursery or during transplanting may be necessary (El Atta and Nour, 1995).

Private landowners

Virtually all forest land in Sudan is in public ownership.

References

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^{OSN} = Other Scientific Name (other names, synonyms, other combinations, etc. that have been used for this species)

Note: entries are indexed often by 3 combinations of the same data set, i.e. host:pest:country, host:country:pest and pest:country:host.

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