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Chairman's Report

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Introduction

To aid in identifying alternatives to pesticides that are Persistent Organic Pollutants (POPs) the UNEP/FAO/Global IPM recently convened a workshop on Termite Biology and Management with a number of termite experts from all continents of the world. This document is a brief summary of the discussions that took place at the workshop. The full workshop report with figures and abstracts from each speaker will be available later in the year.

Background on Termites

Termites are small white to tan in color insects (see front cover of document). Being insects, they have three-body parts head, thorax, abdomen, and six legs. They are also social. This means termites have different looking individuals (called castes) in the nest. The largest individual is the queen. Her job is to lay eggs, sometimes thousands in a single day. A king is always by her side. Other individuals have large heads with powerful jaws, or a bulb-like head that squirts liquid. These individuals are called soldiers. But most termites are called workers. They toil long hours tending to the queen, building the nest, or gathering food. Unique to termites, workers can be male or female. In tropical habitats around the world termites and the large earthen mounds they build are very conspicuous. These mounds are air-conditioned and contain millions of individuals.

There are many people who think termites are ants. They are not! Termites are an ancient insect group. Their roots go back more than 180 million years. Termites belong to the group of insects called Isoptera. This term is Latin and refers to the fact that termites have wings that look very much alike. Features that help to differentiate termites from ants include termites having straight antennae and a broad waist while ants have elbowed antennae and a narrow waist.

There are more than 2,300 different types of termites now recognized. However, most of this diversity can be lumped into our distinct groups dampwood, drywood, subterranean, and mound builders. Dampwood termites are very restrictive in their distribution, most are found in North America. They derive their name from the fact that they live and feed in very moist wood especially stumps and fallen trees on the forest floor. Drywood termites are common on most continents and can survive in very dry conditions, even dead wood in deserts. They do not require contact with moisture or soil. Subterranean termites are very numerous in many parts of the world and live and breed in soil, sometimes many meters deep. Lastly, the mound builders are capable of building earthen towers 8 meters or more in height! Mounds can be soil-based or aerial in trees. These towers are very noticeable and beautiful where they occur. Mounds are common in Africa, Australia, Southeast Asia, and parts of South America. Termite mounds are not found in North America or Europe (see-enclosed table Biology and Ecology of Termites).

Positive Impacts of Termites

Termites contribute significantly to most of the world's ecosystems. They help to fertilize and aerate soils. They also contribute significantly to atmospheric gases. However, their greatest importance is the role they play in recycling wood and plant material. Termites are like six-legged cows and goats that graze the world's grasses and dead trees. Their tunneling efforts also help to ensure soils are porous, contain nutrients, and healthy to support plant growth. Termites are very important to the Sahel where their activity helps to reclaim soils damaged by deserts.

Negative impacts of Termites

Some termites are destructive in their feeding habitats and consume homes and agricultural crops. For some continents lumber is the primarily building material. Lumber is just another name for dead trees. Termites don't intentionally eat our homes, they are just doing what they have been programmed to do for millions of years, eat dead wood! Termites that are most destructive to buildings include *Reticulitermes* and *Coptotermes* both in the subterranean group. These two groups of subterranean termites appear to be increasing worldwide due to increase commerce and the international exchange of people, soils, wooden items, and equipment. Europe, North and South America are currently experiencing expansions and/or invasions of subterranean termites. Termites are not a significant pest problem in agriculture. When damage occurs it appears to be restricted to exotic plants that are water stressed or grown in poor soils. Healthy plants can tolerate some termite damage and yields are not significantly affected.

Persistent Organic Pollutants (POPs)

Attempts in controlling termites have been ongoing for centuries. The earliest attempts at control included wood replacement, use of non-wood building materials, and the hand removal and flooding of nests and mounds. The use of chemicals is a recent phenomenon and has occurred only over the last 60 years! Some of these chemicals are mentioned in the Management of Termites in Urban Ecosystems table. Many of the chemicals developed decades ago are still in use. POPs include the pesticides aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexchlorbenzene, mirex, and toxaphene. A number of POPs pesticides continue to be used for termite control, and under the treaty negotiations exemptions from elimination have been requested for this purpose by some countries for chlordane, heptachlor, and mirex. Information about the on-going treaty negotiations is available through UNEP's Internet based Homepage on POPs (http://www.chem.unep.ch/pops/), and can also be obtained from the secretariat at: UNEP Chemicals, 15, Chemin des Anemones, 1219 Chatelaine, Geneva, Switzerland, Tel: +41.22.9178111, Fax: +41.22.7973460.

Alternatives to POPs

Environmentally safer alternatives to POPs for termite management do exist. The most important foundation for selecting the proper management is a good understanding of the biology and behaviour of the termites that cause the problems. Preventative methods include improved building standards, and use of materials other than wood. Alternative control methods include chemical, non- chemical, parasites, predators, and biological pathogens. Other important factors for consideration to reduce the use of POPs for termite control would be increased government regulation on termite control methods, and increasing public tolerance of termites. Presently, the effectiveness and global acceptance of many chemical alternatives are not known. There is also concern that many of the alternatives to POPs may be cost-prohibitive for many countries. Some POPs alternatives are also proprietary and under franchise constraints that may also limit their acceptance and use. A brief summary of the workshop is contained in the following paragraphs.

Termite Workshop

Eighteen termite researchers and pesticide regulators from around the world gathered for three days to discuss termite biology, ecology, and management. The impetus for the gathering was the on-going negotiations of a global POPs treaty that is planned to be completed by the end of 2000.

This Workshop was the first global attempt to discuss the impact termites have on natural, forest, agricultural, oasis, and urban habitats. Although the focus of the workshop was to identify alternative management strategies to replace or eliminate POPs, it was felt that a global understanding of termites and their the role in the environment was a necessary first step. Much was discussed and debated and more meetings are planned. Listed below are some tangible outcomes that resulted from the workshop.

Workshop Outcomes

The experts agreed to be part of a continued FAO/UNEP Expert Working Group on Termite Biology and Management to further work on alternative control strategies and exchange information. The experts felt all termites could be lumped into four functional groups for which experts agreed to create further working groups. A fifth group, alternative management, was added to aid in the elimination or reduction of POPs usage for termite control. The experts agreed that the creation of these functional groups would increase our understanding of termite biology and speed the gathering of information for POPs alternatives. These termite functional groups and plans for further work are listed below.

1) Termite Functional Groups

… Rhinotermitidae (subterranean termites)/Urban
… Macrotermes/Microtermes/Odontotermes (mostly mound builders)
… Nasutitermes (snout termites, mostly mound and aerial nest builders)
… Kalotermitidae (drywood termites)
… Alternative Management (POPs replacements)

2) Creation of one-page termite biology fact sheets. Also to be available at the POPs Homepage.

3) Creation of termite WebPages containing 2 to 3 pages of essential information for each termite functional group, also to be available at the POPs Homepage.

4) Creation of in-depth booklets containing 20-25 pages of text, illustrations, and photographs for each termite functional group. Booklets should be produced in several languages and be available before the final adoption of the treaty text in May 2001.

5) Continuation of the expert termite working group and creation of a chat group at the POPs homepage.

6) Possible pilot studies on alternative management strategies.

Workshop Participants

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Dr. Nan-Yao Su, Ft. Lauderdale Research & Education Center, Univ. of Florida, Ft. Lauderdale, Florida U.S.A.;
Dr. Thomas Wood, Natural Resources Institute Kent, United Kingdom;
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Dr. Jianhua Zhang, Guangdong Entomological Institute, Guangzhou, The People's Republic of China.

Table 1: Biology and Ecology of Termites

Region	Subregion/country	Number of termite species present	Ecological groups present	Distribution	Comments
Americas	North America	<50	dampwood drywood subterranean	limited, forests in Pacific states, 1 species in desert from 35 degrees southward on continent; hardwood forests, scrubs at <500m most diverse and widespread group, from sealevel to 2000 m	native species rarely attack living plants in natural area
	South America	>400 (Brazil)	subterranean, including mound builders and arboreal nesting species common drywood dampwood	occupy many ecological zones:Amazon, Cerrado, Pampa, Chaca few species	some of the highest termite densities in the world in tropical forests
	Central America, Carribean	limited information in workshop; many species to be described			
Europe		less than 10 from natural habitats and imported species	Reticulitermes *and Calotermes*	primarily Mediterranean, also South 47^0 N and big cities (Paris, Nantes, Hamburg)	

Africa	North Africa	11 species natural and imported species	Subterranean, including mound-builders drywood no dampwood	distribution extended by man over the millennia through commerce and nomadic migrations	
	East Africa	great diversity	mound-builders harvesters	savannas -- highly dependent on resources	decomposing organic matter and turning soil
	West Africa	similar to East Africa	subterranean, mound-builders dominate landscape drywood		xeric conditions: severe competition for resources between termites and other xylophages Sahel: rehabilitate crusted soils CO^2 production
	tropical forests central Africa and savannas/deserts southern Africa	not enough information in this meeting			
Asia	China	>435	subterranean, including mound-builders and harvesters drywood	tropical, subtropical and milder climatic regions south of Yangtze river	
	other Asian countries	not enough information			
Australia		>360	subterranean, including mound-builders, harvesters, dampwood drywood		in-depth understanding ecology/biology limited to 5-15% of species significant contribution to ecology of soils, vegetation and other fauna

Table 2: Management of Termites in Urban Ecosystems

Region	Subregion/country	Estimated expenditures, losses	Regulation of termite management services	Groups and damage	Methods of management
Americas	North America	>1 billion US$/year spent on termite management	highly regulated management and services thousands of pest control firms	drywood and subterranean termites:>90% of management costs	soil drenching with liquid termiticides dominates poor building practices responsible for significant portion of problems
	Chile		small pest management industry	drywood subterranean - introduced species infested 70,000 houses	organophosphates as soil termiticides baiting being tried
Europe		termites spreading in Europe, estimated: >1 billion Euro a year in next 5 years	<200 pest management operators involved with termite work, highly regulated	subterranean	termiticides used: organophosphates, pyrethroids newer chemicals and baits gaining acceptance
Africa			varies from commercial services to physical removal queens and nests		
	Egypt			drywood subterranean	fumigation with MBr, wood surface and injection applications of organophosphates, pyrethroids, and inorganic materials soil application with termiticides and baiting
	Ethiopia		local residents	village housing	removing nests and queens by hand
	Ivory Coast				infrequent use of termiticides, including

					organo chlorines newer chemicals not available motor oil flooding with water
Asia	China	> 1 billion US$/year	pest management state controlled and operated	mainly subterranean: structures and earthen dams of reservoirs drywood	POPs (organochlorines), organophosphates, pyrethroids, fumigants, dust, wood preservatives
Australia		> 100 million $Aus/year	strong regulatory framework, nationwide standard on termite management (whole-of-house); assessment criteria for termite management systems	drywood dampwood mainly subterranean	fumigation chemical barriers, physical barriers, properly designed concrete slabs, baits, dusting, building-out termites; insect pathogens