

WORLD DISTRIBUTION OF *MINTHEA RUGICOLLIS* (COLEOPTERA: LYCTIDAE)

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ABOOD, F. & MURPHY, R. J. 2006. World distribution of *Minthea rugicollis* (Coleoptera: Lyctidae). The distribution of *Minthea rugicollis* worldwide is presented based on a compilation of literature records of population establishments and also from the world collection of *M. rugicollis* at the Natural History Museum, London. The distribution map derived indicates the limits of distribution for *M. rugicollis* to be 40° north and south of the Equator, with maximum distribution within 20° north and south. The present compiled records of occurrence of established populations as well as reports on repeated accidental introductions strongly suggest *M. rugicollis* is not capable of establishing populations under outdoor temperate conditions.

Keywords: Powderpost beetles, pest of timber, wood products, occurrence records

ABOOD, F. & MURPHY, R. J. 2006. Taburan *Minthea rugicollis* (Coleoptera Lyctidae). Taburan *Minthea rugicollis* di seluruh dunia dipaparkan berdasarkan kepustakaan taburan populasi dan juga daripada koleksi sedunia *M. rugicollis* yang terdapat di Natural History Museum, London. Peta taburan yang diperoleh menunjukkan taburan spesies ini terhad di antara 40° utara dan selatan Khatulistiwa, dengan taburan maksimum di antara 20° utara dan selatan. Rekod berkaitan taburan populasi yang disusun ini berserta dengan laporan kemasukan berulang serangga yang berlaku secara tidak sengaja memberi kesimpulan bahawa *M. rugicollis* tidak berupaya untuk mengekalkan populasinya dalam iklim suhu sederhana.

INTRODUCTION

Beetles belonging to the family Lyctidae are amongst the most important degraders of sapwood from seasoned hardwoods worldwide. They are often referred to as powderpost beetles due to the manner in which their larvae reduce infested wood to a fine powdery frass. Powderpost beetles owe their ubiquity largely to their insidious development within a nutrient-filled protective environment that also acts as a buffer to extrinsic fluctuations. Due to this, the lyctids tend to have a wider range of tolerance to variations in climatic conditions than would otherwise be possible. Their presence in imported timbers has often been unsuspected and they are quick to establish populations under suitable conditions, with the result that several species are now rather widely distributed.

Powderpost beetles belonging to the genus *Lyctus* are widespread in temperate regions, but

in warmer areas it is largely replaced by the genus *Minthea* (Browne 1938, Booth *et al* 1990). An important species which occurs predominantly in the tropics and is subcosmopolitan in distribution is *M. rugicollis* (Abood *et al.* 1992). Although *M. rugicollis* is indigenous to several tropical countries, the species exists in limited population numbers in humid natural forests. It presumably leads a precarious existence, living on the dry sapwood of fallen trees (Browne 1938) and has attracted little attention in the natural environment where it plays its role in the successional degradation of timber and other cellulosic plant materials of lower moisture contents.

With impending timber shortages and concerns over depleting forest resources in many countries, intense efforts have been made to maximize utilization of forest resources including

lesser known or underutilized species, lower grade timbers and also to encourage a more widespread use of sapwood in timber products. Utilization of such materials which are often of lower resistance to wood degrading insects has led to greater prominence of *M. rugicollis* as a pest of seasoned timber and their products. Although there is no documented evaluation thus far on economic losses caused by *M. rugicollis*, the impact of damage caused by this species in the forest products industry is nevertheless of increasing significance in the economy of many tropical countries.

In this study, preserved adult specimens of *M. rugicollis* from the worldwide collection held at the Natural History Museum, London were sorted and examined. The countries where the species have been found were recorded and mapped out.

RESULTS

A total of 80 specimens of *M. rugicollis* were found in the worldwide collection at the British Museum of Natural History. The results were based on collections made between 1902 and 1995. This information together with an extensive review of records of occurrence and literature reports until end of 2005 were used to compile the distribution list shown in Table 1.

Figure 1 illustrates the world distribution map for *M. rugicollis*. This species has been recorded in 39 countries and five regions. The map indicates the limits of distribution for the species to be 40° north and south of the Equator, with maximum distribution within 20° north and south. The collections listed by regions (marked ^δ in Table 1) are not indicated on the map as the exact country of origin was not reported or was unknown.

DISCUSSION

Minthea rugicollis is essentially tropical in origin and thrives best in areas of high rainfall. Under equatorial conditions the beetles breed all year round due to constant high temperatures which are favourable to the development of the beetle (Beeson & Bhatia 1937, Browne 1938, Menon 1957, Abood *et al.* 1994).

Minthea rugicollis is distributed throughout tropical Asia, East Africa and Northern Australia (Browne 1938). The species had been considered

as the most common lyctid powderpost beetle in Java and Sumatra (Kalshoven 1963). In Sumatra it is mainly restricted in occurrence to the plains and hills up to some 300 m, including the teak area of Central and East Java (Beeson & Bhatia 1937). The species was also recorded as a dominant pest of the Andamans (Beeson & Bhatia 1937). There are also reports to show its occurrence from Central Africa to India, Myanmar, Sri Lanka and throughout the Malay Archipelago (Browne 1938, Menon 1957).

In the Philippines, the species occurred in domestic premises, sawmills, lumberyards and factories (Francia & Garcia 1958). The beetles commonly attack wood products and articles of bamboo and rattan, all of which are important materials in the local and export industries. The species was also considered as an important pest of seasoned wood products in Brazil (Zanotto *et al.* 1985) and China (Shi & Tan 1981).

From a questionnaire conducted in 17 countries, *M. rugicollis* was rated as among the most important wood-destroying species in India (in the State of Kerala), Nigeria and United States of America (Serment 1981). It should be noted, however, that the majority of the countries surveyed were in Europe. This finding supports the earlier report by Beeson (1933) who stated that *M. rugicollis* was abundant in the wetter parts of Nigeria, parts of India and the United States. Information has also been cited on the occurrence of *M. rugicollis* in Japan (Sonda 1969, Iwata 1982) and Israel (Halperin & Geis 1999). In the latter, *M. rugicollis* was reported as one of the seven species of Lyctidae found and occurrence of the species in Sinai was recorded for the first time.

Repeated introductions into the Republic of Germany (Cymorek 1970), the United Kingdom (Baker & Berry 1978) and Italy (Gambetta 1983) have been reported. However, there has been no documented evidence of the population becoming established in these countries.

The literature survey conducted on reports of population establishments, records of occurrence, repeated accidental introductions as well as the information derived from the world collection of *M. rugicollis* shows that this species is essentially tropical with a subcosmopolitan distribution. This result strongly suggests *M. rugicollis* is not capable of establishing populations under ambient outdoor temperate conditions. Studies conducted on

Table 1 Occurrence records of *M. rugicollis* worldwide

Andaman Island* (Beeson & Bhatia 1937)
Annobon Islands*
Argentina (Gerberg 1957)
Benin (Lesne 1924)
Brazil (Gerberg 1957, Zanotto <i>et al.</i> 1985)
Central African Republic ^δ (Beeson 1933, Browne 1938, Menon 1957)
Chile (Gerberg 1957)
China* (Shi & Tan 1981)
Christmas Islands*
Cuba (Gerberg 1957)
East Africa ^δ (Gerberg 1957, Kalshoven 1963)
East Indies ^δ (Gerberg 1957)
El Salvador (Gerberg 1957)
Ethiopia (Gerberg 1957)
Fiji*
French Guiana (Lesne 1924)
Ghana*
Guinea (Gerberg 1957)
Guyana (Gerberg 1957)
Hong Kong*
India* (Lesne 1924, Beeson 1933, Beeson & Bhatia 1937, Browne 1938, Gerberg 1957, Menon 1957, Serment 1981)
Indochina (Lesne 1924)
Indonesia* (Lesne 1924, Gerberg 1957, Kalshoven 1963, Ismanto 1990)
Israel (Halperin & Geis 1999)
Ivory Coast (Lesne 1924)
Japan* (Sonda 1969, Iwata 1982)
Madagascar* (Lesne 1909)
Malaysia* (Beeson 1933, Beeson & Bhatia 1937, Dhanarajan 1977, Lesne 1909, Menon 1957, Miller 1934, Abood <i>et al.</i> 1992)
Mexico (Gerberg 1957)
Myanmar (Beeson & Bhatia 1937, Menon 1957)
New Caledonia (Lesne 1924)
Nigeria* (Akanbi 1978, Serment 1981)
North Australia (Beeson 1933, Beeson & Bhatia 1937, Gerberg 1957, Kalshoven 1963)
Panama (Gerberg 1957)
Philippines* (Francia & Garcia 1958)
Puerto Rico (Gerberg 1957)
Sri Lanka* (Beeson 1933, Menon 1957)
Taiwan*
Tanzania*
Thailand*
Uganda*
United States of America* (Gerberg 1957, Lesne 1909, Serment 1981)
Venezuela (Gerberg 1957)
West Africa ^δ (Coleman & Baker 1974)
West Indies ^δ * (Lesne 1924)
Zaire (Lesne 1924)

* Information obtained from the worldwide collection at the Natural History Museum, London

δ Collections reported by region



Figure 1 Distribution map for *Minthea rugicollis*

effects of extrinsic factors on population growth and development of *M. rugicollis* have provided evidence that the adults are tolerant of and are able to survive up to 10 weeks at 20 °C. However, the species is not able to establish a population at this temperature or lower (Abood 1995).

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REFERENCES

- ABOOD, F. 1995. Biology and insect-wood relations of the powderpost beetle, *Minthea rugicollis* (Walk.) (Coleoptera: Lyctidae), on rubberwood. Ph.D. thesis, University of London.
- ABOOD, F., BERRY, R. W. & MURPHY, R. J. 1992. *Minthea rugicollis* (Walk.) (Coleoptera: Lyctidae): A Pest of Rubberwood. International Research Group on Wood Preservation. Document Number IRG/WP/1570-92.
- ABOOD, F., MURPHY, R. J. & BERRY, R. W. 1994. *New Perspectives on the Biology of the Tropical Powderpost Beetle, Minthea rugicollis* (Walk.). International Research Group on Wood Preservation. Document Number IRG/WP/94-10085.
- AKANBI, M. O. 1978. *Trend in Entomology of Wood in Use and in Storage in Nigeria*. International Research Group on Wood Preservation. Document Number IRG/WP/180.
- BAKER, J. M. & BERRY, R. W. 1978. *Exotic Timber Insect Species Intercepted in the U.K. Since 1945*. International Research Group on Wood Preservation. Document Number IRG/WP/182.
- BEESON, C. F. C. 1933. *Lyctus* beetles in India. *Indian Forester* 59(3): 158–164.
- BEESON, C. F. C. & BHATIA, B. M. 1937. On the biology of the Bostrychidae. *Indian Forest Records, Entomology* (New Series) 2(12): 223–323.
- BOOTH, R. G., COX, M. L. & MADGE, R. B. 1990. *IIE Guides to Insects of Importance to Man. 3. Coleoptera*. C.A.B. International, Oxon.
- BROWNE, F. G. 1938. The common Malayan powder-post beetle, *Minthea rugicollis* Walk. (Coleoptera: Lyctidae). *Malayan Forester* 7(3): 107–120.
- COLEMAN, G. R. & BAKER, J. M. 1974. Resistance to dieldrin and gamma-BHC in the wood-boring insect *Minthea rugicollis* (Walk.) (Coleoptera, Lyctidae). *International Biodeterioration Bulletin* 10(4): 115–116.
- CYMOREK, S. 1970. Eingeschleppte und einheimische bohr- und splintholzkäfer als holzschädlinge (Coleoptera:

- Bostrychidae, Lyctidae): uebersicht zur lebensweise, über vorkommen, einschleppungen, wirtschaftliche Bedeutung, Bekämpfung. *Zeitschrift Fuer Angewandte Entomologie* 66(2): 206–224.
- DHANARAJAN, G. 1977. Degradation of wood by insects and other organisms in Malaysia. Pp. 287–299 in Sastry C. B., Srivastava, P. B. L. & Abdul Manap, A. (Eds.) *A New Era in Malaysian Forestry*. Universiti Pertanian Malaysia Press, Serdang.
- FRANCIA, F. C. & GARCIA, M. L. 1958. Powder-post beetles (bukbok) injurious to wood and other forest products. *Lumberman* (Philippines) 10(3): 6–7.
- GAMBETTA, A. 1983. *List of Insects Intercepted in Imported Timbers in Italy*. International Research Group on Wood Preservation. Document Number IRG/WP/1217.
- GERBERG, E. J. 1957. *A Revision of the New World Species of Powderpost Beetles Belonging to the Family Lyctidae*. USDA Technical Bulletin No. 1157.
- HALPERIN, J. & GEIS, K. U. 1999. Lyctidae (Coleoptera) of Israel, their damage and its prevention. *Phytoparasitica* 27(4): 257–262.
- ISMANTO, A. 1990. Several rattan destroying powder post beetles and their prevention methods. *Duta Rimba* 115–116 (XVI): 8–11.
- IWATA, R. 1982. Occurrence records of *Minthea rugicollis* (Walker) and an unrecorded species, *Lyctus africanus* (Lesne) (Col., Lyctidae) from Japan. *Kaoku Gaichû, Tokyo* 11 (13/14): 60–63. [In Japanese]
- KALSHOVEN, L. G. E. 1963. Notes on the biology of Indonesian Bostrychidae. *Entomologische Berichten* 23: 242–257.
- LESNE, P. 1909. Notes sur les Coléoptères Térédiles. 3. Les Lyctides et Bostrychides des Archipels Atlantique. *Muséum National D' Histoire Naturelle Bulletin* 15: 347–350.
- LESNE, P. 1924. Les Coléoptères Bostrychides de l'Afrique tropicale Française. *Encyclopaédie Entomologique* (Series A) 3: 77–109.
- MENON, K. D. 1957. Susceptibility of commercial species of Malayan timbers to powder-post beetle attack. *Malayan Forester* 20(1): 19–23.
- MILLER, N. C. E. 1934. *Coleopterous Pests of Stored Derris in Malaya*. Science Series, Department of Agriculture, Straits Settlement and Federated Malay States No. 14.
- SERMENT, M. M. 1981. *The Most Important Wood-destroying Insects in Various Countries*. International Research Group on Wood Preservation. Document Number IRG/WP/1136.
- SHI, Z. & TAN, S. 1981. A study on lyctid powder-post beetle (*Minthea rugicollis* Walker). *Scientia Silvae Sinicae* 17(4): 406–412.
- SONDA, M. 1969. *Minthea rugicollis* (Walker) breeding in Northern Kyushu, Japan (Coleoptera: Lyctidae). *Kontyû* 37(4): 395–396.
- ZANOTTO, P. A., CAÑEDO, M. D. & DE LELIS, A.T. 1985. *Wood Attacking Insects in Urban Areas in San Paulo State Brazil*. International Research Group on Wood Preservation. Document Number IRG/WP/1267.

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