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The cases of Bostrichidae infestation in Japan

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Abstract

The infestation cases from 1980 – 2014 were obtained from Japan pest control companies. A total of 52 cases were reported from the past 34 years, concentrated mostly in Chubu and Kinki regions. Low intensity of Bostrichidae infestation was recorded in the Northern of Japan. Of 52 cases, approximately 65% were caused by *Lyctus* species, with 23 cases by *L. brunneus*, followed by 11 cases by *L. africanus*. The infestations by other Bostrichidae e.g. *H. hamatipennis*, *D. minutus*, *M. rugicollis*, *L. sinensis*, and *L. linearis* were comparatively low, although these Bostrichidae were also found to have become established in Japan.

Bostrichidae, powder-post beetles, are among the most destructive wood attacking beetles that are of economic importance in forestry and lumber industries. It comprises at least 550 described species in 99 genera worldwide (Ivie 2002). Most bostrichids are not host-specific and attack wide range of timber. Both the adults and larvae cause extensive damage to timber by boring into the timber, feeding on the woody tissues of the timber for development, and reducing the wood into fine flour-like dust known as frass. The presence of their attacks in the timber is often undetectable until the appearance of hole or frass been produced.

Of 550 identified bostrichids species distributed worldwide, 16 species are currently found in Japan. These bostrichidae were not origin from japan. They were introduced into Japan by imported furniture or wood from mostly Southeast Asia. However, only 8 of them were found to have become established in

Appendix 1. Example of the survey form sending to pest control companies

調査用紙：過去からの変遷も重要な調査項目となりますので、できるだけ多くのデータのご記入をお願いいたします。

複数の枚数となる場合は、本用紙をコピーしてお使い下さい。

年	加害昆虫種（別紙をご参照下さい）	被害発生場所（市町村レベルまでお答えいただければ助かります）	物件数	被害を受けた家具/部材	被害を受けた樹種	被害を受けた部材の原産地および加工地	被害の状況
例：2013	例：La	例：京都市	9	例：机、椅子、木製おもちゃ、床、壁など	例：ラワン材	例：マレーシア	例：新築住宅の壁下地材（南洋材合板）より成虫が脱出
~~2015~~							
2012 ～ 2014	La	和歌山市	1	壁、フロア	ラワン材		新築後 7年めに 1F・2Fの フロア 1F・2Fの クロス 壁(コンパネ)より成虫が脱出

Japan: *Heterobostrychus hamatipennis* Lesne, *Rhizopertha dominica* (Fabricius), *Dinoderus minutus* Fabricius, *Lyctus africanus* Lesne, *Minthea rugicollis* (Walker), *L. sinensis* Lesne, *L. linearis* (Goeze), and *l. brunneus* (Stephens) (Mito and Uesugi 2004). These species have become invasive that brought adverse

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effect to several economic industries in Japan, especially forestry and lumber industries.

Up to date, the intensity of Bostrichidae infestation in Japan is unknown. So, the infestation cases from 1980 – 2014 were obtained from Japan pest control companies. These cases were based on the complaints from the public to the companies. Of 700 companies, we only obtained the feedbacks from 20 companies. The information from the feedbacks were as stated in Appendix 1.

From the feedbacks, a total of 52 cases were reported from the past 34 years, concentrated mostly in Chubu and Kinki regions (Figure 1). Of the 52 cases, approximately 65% were caused by *Lyctus* species, with 23 cases by *L. brunneus*, followed by 11 cases by *L. africanus*. In Nigata and Wakayama, 8 cases caused by *L. brunneus* and *L. africanus*, respectively, were reported. This report was based on the feedbacks from the 20 companies out of 700 companies. So, the cases is expected to be greater than the presently reported cases. From Figure 1, it also showed low intensity of Bostrichidae infestation in the Northern of Japan. Environmental factor, e.g. cool weather might play a role for the low infestation. For example, in Hokkaido, the weather was relatively cool throughout the year, with the temperature not exceeding 25℃ in the summer. The cool weather is not favorable for Bostrichidae to establish their population as mentioned by Sutherst (1991), and Robinet and Roques (2010).

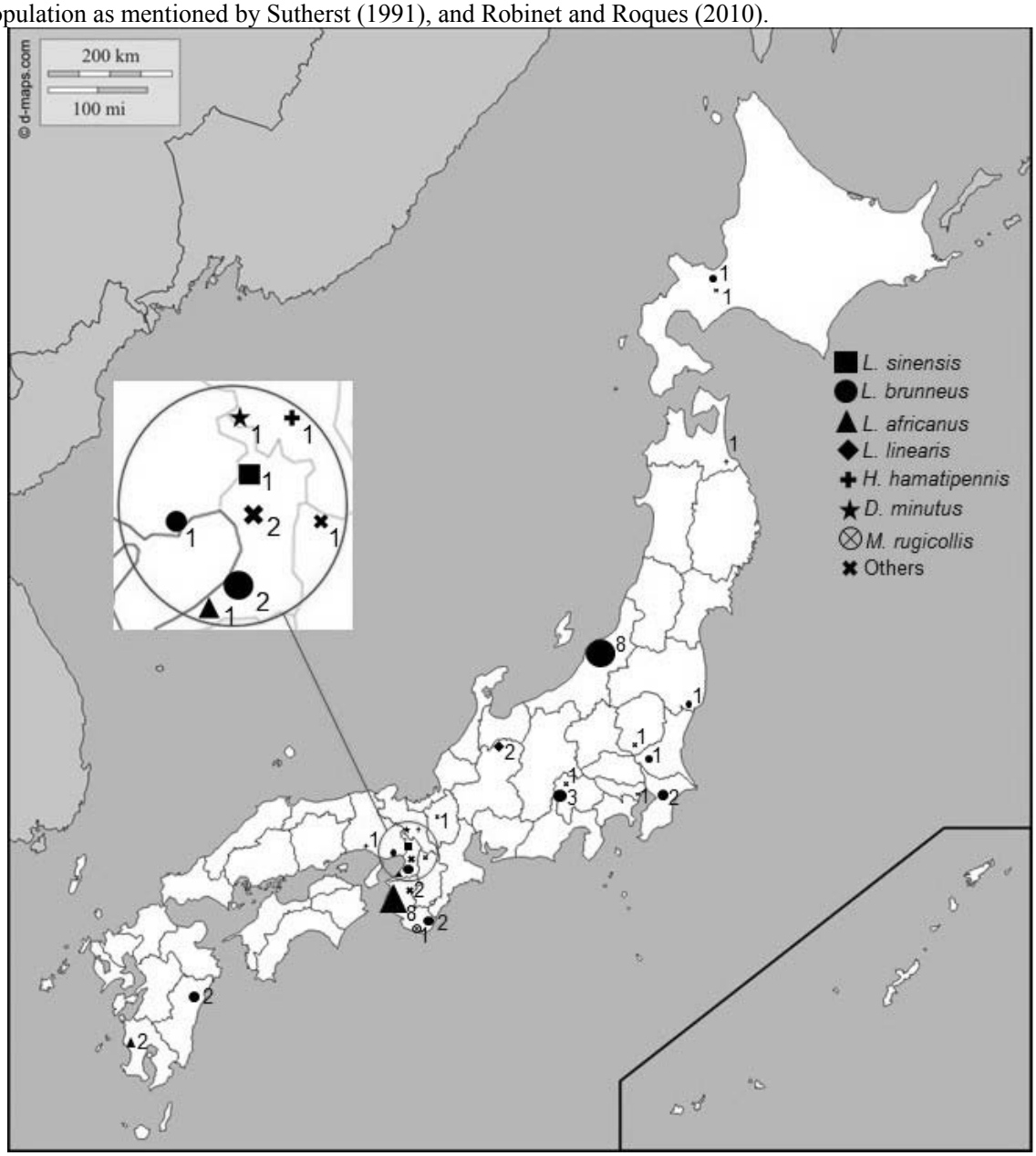

Figure 1. Reported bostrychidae infestation in Japan from 1984 to 2014

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Both *L. brunneus* and *L. africanus* were found to infest wooden objects of the houses (Figure 2). As wooden structure buildings are very common in Japan. So, it is not uncommon to see the beetles infest the floors, ceilings, and walls, especially on the plywood and veneer. It was reported that the infestation by the beetles not only restricted to softwood, but they also infested plywood or veneer made of hardwood (Figure 3).

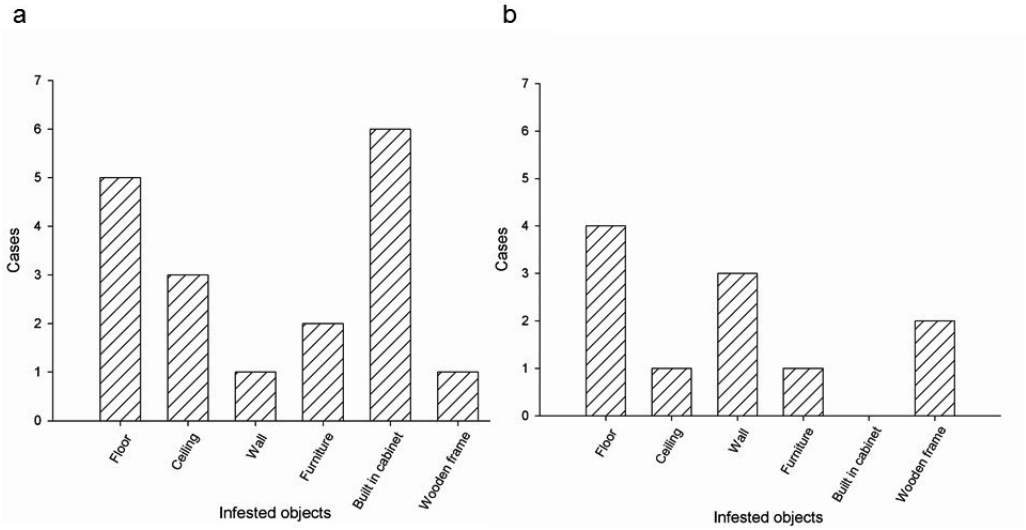

Figure 2. Housing objects infested by a) *L. brunneus* and b) *L. africanus*

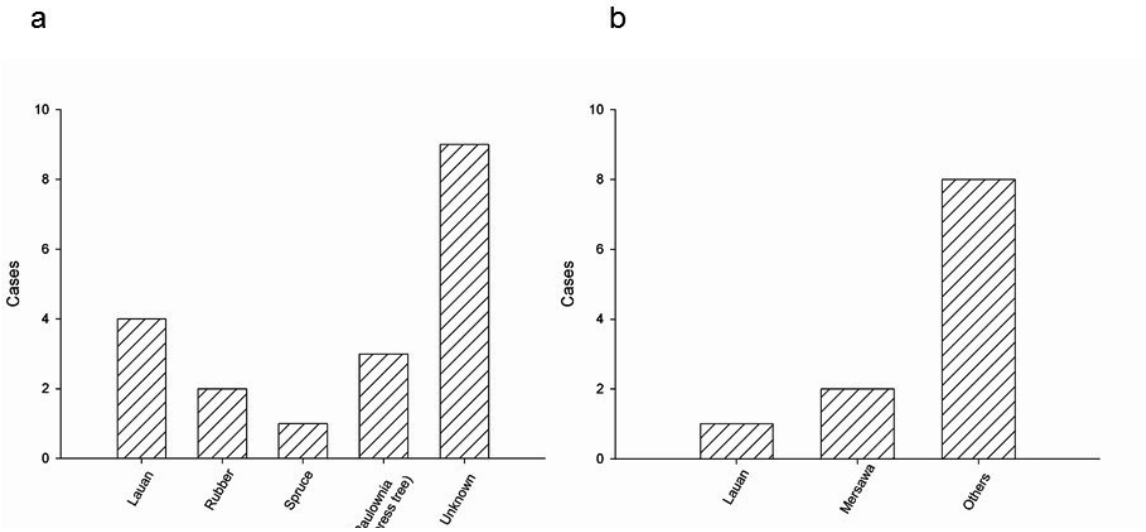

Figure 3. Types of woods infested by a) *L. brunneus* and b) *L. africanus*

The infestations by other Bostrichidae e.g. *H. hamatipennis*, *D. minutus*, *M. rugicollis*, *L. sinensis*, and *L. linearis* were comparatively low, although these Bostrichidae were also found to have become established in Japan (Figure 1). Similar to *L. brunneus* and *L. africanus*, these Bostrichidae were reported to infest wooden objects of the houses (Table 1).

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Table 1. Types of objects infested by wood attacking beetles

Species	Infested objects
L. linearis	Furniture (desk, shelf), wall
L. sinensis	Furniture (bed)
H. hamatipennis	Floor, ceiling, decorative wooden objects
D. minutus	-
M. rugicollis	Ceiling
Others	Wall, staircase

Recently, *H. aequalis* (Waterhouse) (Figure 4), another invasive alien species has caught the public's attention in Japan. This species was introduced and intercepted in Japan from imported timber and timber products, but establishment of this species in Japan has not yet been recorded. This beetle was first found in seasoned wood of imported lauan timber in Naha, Okinawa (Nobuchi 1986). Then, another 2 cases were reported in 1994 and 1995 (Kawakami 1996). Although there were no infestation cases reported in our study (Figure 1), the occurrence of this species is increasing and gradually becoming pest in Japan (pers. comm.).

The development of Bostrichidaae is confined in the wood. So, early detection of the presence of these beetle is impossible until holes and frass have been produced, which indicates serious damage on the wood. So, it is always a challenge to forestry and lumber industries to carry out remedial action on the infested wood to eradicate the beetle. To early detect the presence of Bostrichidae, pheromone-based trap is one approach. Thus, pheromone study of these Bostrichidae is in dire need in effort to develop sustainable pest management in ways that minimize economic, health, and environmental risks in forestry and lumber industries.

Acknowledgements

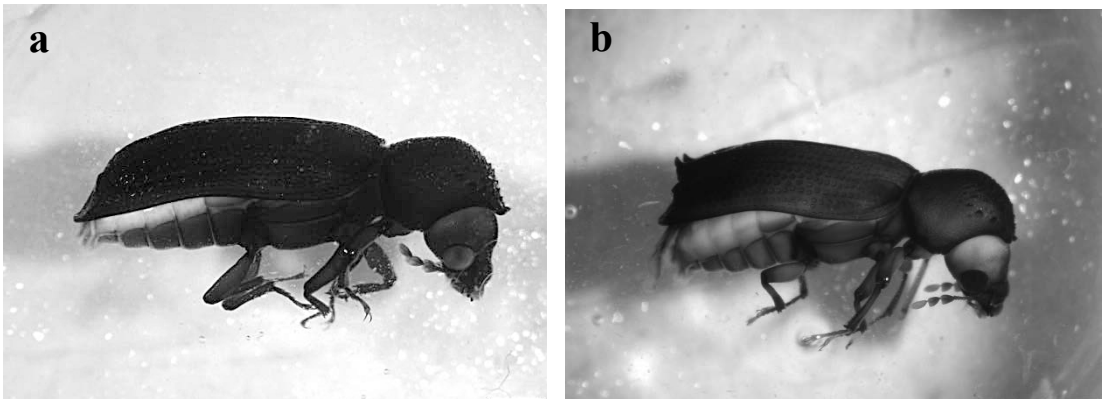

Figure 4. The (a) female, and (b) male of *H. aequalis*

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