

Mass death of crickets, *Gryllus bimaculatus*, at Old Upper Thomson Road

Andie H. F. Ang & Tan Ming Kai

orthoptera.mingkai@gmail.com (Tan)

Subjects: Field cricket, *Gryllus (Gryllus) bimaculatus* (Insecta: Orthoptera: Gryllidae: Gryllinae).

Subjects identified by: Tan Ming Kai.

Location, date and time: Singapore Island, Old Upper Thomson Road; 17 January 2018; 1210 hrs.

Habitat: Metalled road with grassy edges and flanked by secondary forest.

Observer: Andie H. F. Ang.

Observation: At least 24 dead *Gryllus (Gryllus) bimaculatus* crickets were observed on the road (Figs. 1a, 1b) at around noon. The crickets appeared trampled upon, and squashed, probably by vehicles. The dead bodies appeared fresh, suggesting that they were recently killed. Loud cricket calls were also heard on the roadside grassy patch, where at least 30 live crickets (Figs. 1c, 1d) were counted. At about 1215 hours, around nine long-tailed macaques (*Macaca fascicularis fascicularis*) across all ages (from adults to infants) and sex groups were observed leaving the forest next to the road to feed on live crickets on the grass and dead crickets on the road (Fig. 2). More macaques were seen in the vicinity, and they may also be feeding on the crickets.



Fig. 1. Crushed examples of *Gryllus bimaculatus* crickets observed on the road (a, b), a live nymph on the road (c), and an adult female on the grass (d). Photographs by Andie H. F. Ang.



Fig. 2. An adult male long-tailed macaque holding a cricket. Photograph by Andie H. F. Ang

Remarks: In Singapore, *Gryllus bimaculatus* and *Acheta domesticus* are two species of crickets that are commonly sold as live food for insectivorous pets (personal observations). In other parts of Southeast Asia, these two species are also consumed by humans (e.g., Halloran et al., 2017a, 2017b; Tan et al. 2017). *Gryllus bimaculatus* can be found naturally in Singapore. However, there is no record of *Acheta domesticus* being native there (Tan, 2017), despite morphological similarities to the native Gryllinae of the genera *Velarifictorus* and *Loxoblemmus*. *Gryllus bimaculatus* and *Acheta domesticus* are often commercially cultured in this region (e.g., Halloran et al., 2017b; Tan et al. 2017). Owing to their ready availability at relatively low prices, we are aware that both cricket species have been used for religious release.

Despite there being no actual witness of the event, we can infer that the occurrence of a large number of crickets on the road in the featured observation was likely caused by anthropogenic release of these insects. Even though it is not uncommon among crickets to form chorusing aggregations (Simmons, 1988), these crickets do not occur naturally in large numbers, especially on the road. *Gryllus bimaculatus* tends to inhabit grasslands (Dawwrueng et al., 2017), including those near Old Upper Thomson Road (see Tan, 2017). It is also unlikely to venture into the open road in the middle of the day as the tarmac would be too hot. Behavioural experiments on congeners have shown that high temperatures negatively affect their reproduction, immunity, and disease resistance (Adamo & Lovett, 2011). Crickets in general tend to call at night, thus it is unnatural to hear them calling in the day as it is likely to attract predators. Males of *Gryllus bimaculatus* excavate burrows in which they reside and call to attract females. In addition to providing a safe refuge, the burrow morphology also helps to amplify the calling sound (Simmons, 1988). The unnatural behaviour of the crickets observed along Old Upper Thomson Road indicates that they do not belong to a native population.

It is not recommended to use these crickets for mercy releases, since they are not likely to survive. In aquarium shops, crickets are sold packed in high densities within small plastic boxes. As they are rarely fed or provided with water, they tend to feed on the paper or saw dust provided to keep the containers dry, or cannibalise one another (personal observations). Being kept in unhygienic conditions means that the crickets are also in poor health. Releasing large numbers of crickets can also cause a nuisance to the natural environment, and can draw native animals to feed on them. The macaques in the featured observation, that were attracted to the road to feed on the crickets, could be in danger of being run over by passing vehicles. Indeed, macaque roadkills have been recorded along that very road (personal observations). This is akin to feeding macaques which can lead to unwanted human-wildlife conflicts (Sha et al., 2009; Tan, 2017). It is highly likely that *Acheta domesticus*, the

other easily available but non-native cricket, has also been used for mercy releases. That it has not been documented occurring in Singapore suggests that it is unable to survive in the wild there.

Introduced species can cause negative impacts on the natural environment, economy, and society (Kolar & Lodge, 2001). There are numerous pathways in which organisms can be introduced, and this is often case-specific (Kolar & Lodge, 2001). In Southeast Asia, there is a traditional practice, particularly among Buddhists, of releasing animals into the wild to build good karma. This usually occurs around, but not restricted to, the Vesak Day period (Shiu & Stokes, 2008). The types of animals used typically include birds, frogs, and fishes purchased from aquarium shops or food markets. Many of these animals are non-native (Yeo & Chia, 2010) and tend not to survive after release. However, those that do can potentially be invasive. The National Parks Board (NParks), the local governing authority, has been actively discouraging animal releases through policing the nature reserves and through public education (Genovesi & Monaco, 2013) in which 'Operation No Release' was established to tackle the problem (Yeo & Chia, 2010). Instead of using larger animals, some practitioners have turned to insects, such as crickets and butterflies. This shift is likely attributed to these creatures being smaller, relatively cheaper, less bulky, as well as being much less conspicuous (Tan, 2014). Nonetheless, our observation demonstrates that releasing these crickets can only cause more harm than good to the crickets' survivability and the local native environment.

Note: The authors thank Maosheng Foo for providing suggestion to the likely release of crickets by devotees, and providing feedback on the article. Support for the Raffles' Banded Langur Working Group by Wildlife Reserves Singapore Conservation Fund is gratefully acknowledged. The work of MKT was supported by the Lady Yuen Peng McNeice Graduate Fellowship of the National University of Singapore.

References:

- Adamo, S. A. & M. M. Lovett, 2011. Some like it hot: the effects of climate change on reproduction, immune function and disease resistance in the cricket *Gryllus texensis*. *Journal of Experimental Biology*. 214 (12): 1997–2004.
- Dawwrueng, P., M. K. Tan, T. Artchawakom & S. Waengsothorn, 2017. Species checklist of Orthoptera (Insecta) from Sakaerat Environmental Research Station, Thailand (Southeast Asia). *Zootaxa*. 4306 (3): 301–324.
- Genovesi, P. & A. Monaco, 2013. Guidelines for addressing invasive species in protected areas. In: Foxcroft, L. C., P. Pyšek, D. M. Richardson & P. Genovesi (eds.). *Plant Invasions in Protected Areas*. F. Springer, Netherlands. pp. 487–506.
- Halloran, A., Y. Hanboonsong, N. Roos & S. Bruun, 2017a. Life cycle assessment of cricket farming in north-eastern Thailand. *Journal of Cleaner Production*. 156: 83–94.
- Halloran, A., N. Roos & Y. Hanboonsong, 2017b. Cricket farming as a livelihood strategy in Thailand. *The Geographical Journal*. 183 (1): 112–124.
- Kolar, C. S. & D. M. Lodge, 2001. Progress in invasion biology: predicting invaders. *Trends in Ecology & Evolution*. 16 (4): 199–204.
- Leow, A., 2017. Public reminded not to release animals into the wild ahead of Vesak Day. *The Straits Times* (online edition). May 2, 2017. <http://www.straitstimes.com/singapore/environment/public-reminded-not-to-release-animals-into-the-wild-ahead-of-vesak-day>
- Sha, J. C. M., M. D. Gumert, B. P. Y.-H. Lee, L. Jones-Engel, S. Chan & A. Fuentes, 2009. Macaque-human interactions and the societal perceptions of macaques in Singapore. *American Journal of Primatology*. 71 (10): 825–839.
- Simmons, L. W., 1988. The calling song of the field cricket, *Gryllus bimaculatus* (De Geer): constraints on transmission and its role in intermale competition and female choice. *Animal Behaviour*. 36(2): 380–394.
- Shiu, H & L. Stokes, 2008. Buddhist animal release practices: historic, environmental, public health and economic concerns. *Contemporary Buddhism*. 9 (2): 181–196.
- Tan M. K., 2017. *Orthoptera in the Bukit Timah and Central Catchment Nature Reserves (Part 2): Suborder Ensifera*. 2nd Edition. Lee Kong Chian Natural History Museum, National University of Singapore. 101 pp.
- Tan, M. K., T. Artchawakom & H. T. W. Tan, 2017. Mass cricket rearing in a small farm in Nakhon Ratchasima, Thailand. *UTAR Agriculture Science Journal*. 3: 29–33.
- Tan, A., 2014. Devotees release bugs instead of animals for Vesak Day. *The Straits Times* (online edition). May 13, 2014. <http://www.straitstimes.com/singapore/devotees-release-bugs-instead-of-animals-for-vesak-day>
- Tan, A., 2017. Expert panel set up to develop SOP for monkey problems. *The Straits Times* (online edition). October 22, 2017. <http://www.straitstimes.com/singapore/environment/expert-panel-set-up-to-develop-sop-for-monkey-problems>
- Yeo, D. C. J. & C. S. W. Chia, 2010. Introduced species in Singapore: an overview. *COSMOS*. 6 (1): 23–37.