

## It is not inside, it is on top! An example of vehicular-rafting by a house gecko (*Hemidactylus frenatus* Schlegel, 1836)

Gerrut Norval <sup>1,\*</sup>, Fang-Ying Lu <sup>2</sup>, Jean-Jay Mao <sup>3</sup>, and Kerry Slater <sup>1</sup>

The house gecko (*Hemidactylus frenatus* Schlegel, 1836) is primarily an oriental species, its native range extending from India, eastwards through China, to Taiwan and Okinawa, as well as many islands in the Indian Ocean, Pacific Ocean, and the Indo-Australian Archipelago (Spawls et al., 2002; Goris and Maeda, 2004). In Taiwan, this gecko species mainly occurs at altitudes below 1000 m in the central and southern parts of the island, and on the outlying islets (Shang and Lin, 2001; Lue, Tu and Shang, 2002). Several individuals have however, also been recorded in northern parts of the main island (Shang and Lin, 2001; Lue, Tu and Shang, 2002).

On the 28th of May 2012, at ca. 09:00, the second author parked his vehicle (Honda CRV-3) under a tree in the industrial zone in Beidou, Changhua County, central western Taiwan. About an hour later he drove the vehicle for a distance of ca. 50 km to another location in Mingshong Township, Chiayi County, south-western Taiwan, where he parked the vehicle on the side of the road for about 30 minutes. He then drove the vehicle for a distance of ca. 10 km to his office in Taibao City, Chiayi County. Enroute, from Mingshong Township to Taibao City, while driving along the highway, he noticed a *H. frenatus* on the top of the right rear-view mirror of the vehicle. Despite the vehicle reaching speeds of ca. 100 km/h, the gecko remained in this position until the vehicle stopped in Taibao City.

Davis and Thompson (2000) termed dispersal of a species over widely distant environments, often separated by some barrier, as saltation dispersal, and

short-distance dispersal to adjacent, or nearly adjacent environments, as diffusion dispersal. The existence of exotic invasive populations of *H. frenatus* in East Africa, St. Helena, Mexico, Belize, Panama, Florida, and parts of Australia (Cogger, 2000; Lee, 2000; Spawls et al., 2002; Meshaka, Butterfield and Hauge, 2004) confirms that *H. frenatus* can be transported intentionally and/or accidentally over vast distances (i.e. saltation dispersal).



**Figure 1.** Photographs (top and centre) of the *Hemidactylus frenatus*, taken while the vehicle was traveling along a rural road in Chiayi County (photographed by Mai-Lan Hsu), and a photograph of the gecko, still on the rear-view mirror, when the vehicle was parked in Taibao City, Chiayi County (photographed by Fang-Ying Lu).

<sup>1</sup> Applied Behavioural Ecology & Ecosystem Research Unit, Department of Environmental Sciences, UNISA, Private Bag X6, Florida, 1710, Republic of South Africa.

<sup>2</sup> No. 121, Chiantan Li, Taibao City, Chiayi County, 612, Taiwan, R.O.C.

<sup>3</sup> Department of Forestry and Natural Resources, National Ilan University, No. 1, Sec. 1, Shen-Lung Rd., Yilan, 260, Taiwan, R.O.C.

\*Corresponding author; e-mail: gnorval@gmail.com

For saltation dispersal, the geckoes would have to be hiding in or among objects being transported as described in Gill, Bejakovtch and Whitaker (2001), and the greater majority of diffusion dispersal most likely also takes place in this manner (e.g. Norval and Mao, 2007). Although the vehicular-rafting observation of *H. frenatus* described in this paper was made within the native range of *H. frenatus*, it demonstrates that these geckoes can be transported to new localities on the exterior of vehicles. Vehicular-rafting has also been implicated in the spread of *Anolis sagrei* in parts of the USA, where it is an exotic invasive species (Campbell, 1996). Due to their small size and the ability to crawl into small spaces, it must be taken into consideration that any vehicles can be agents for diffusion dispersal of *H. frenatus*.

In localities where this species is established, this factor should be taken into consideration when deciding on the management plans, which as suggested by Davis *et al.*, (2011), should realistically weigh up the feasibility of eradication against accepting the species and incorporation of it as an addition to the native fauna.

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## References

- Campbell, T.S. (1996): Northern range expansion of the brown anole (*Anolis sagrei*) in Florida and Georgia. *Herpetological Review* **27**: 155-157.
- Cogger, H.G. (2000): *Reptiles and Amphibians of Australia*. 6th edition. Sydney, Reed New Holland.
- Davis, M.A., Chew, M.K., Hobbs, R.J., Lugo, A.E., Ewel, J.J., Vermeij, G.J., Brown, J.H., Rosenzweig, M.L., Gardener, M.R., Carroll, S.P., Thompson, K., Pickett, S.T.A., Stromberg, J.C., Del Tredici, P., Suding, K.N., Ehrenfeld, J.G., Grime, J.P., Mascaro, J., Briggs, J.C. (2011): Don't judge species on their origins. *Nature* **474**: 153-154.
- Davis, M.A., Thompson, K. (2000): Eight ways to be a colonizer; two ways to be an invader. *Bulletin of the Ecological Society of America* **81**: 226-230.
- Gill B.J., Bejakovtch, D., Whitaker, A.H. (2001): Records of foreign reptiles and amphibians accidentally imported to New Zealand. *New Zealand Journal of Zoology* **28**: 351-359.
- Goris, R.C., Maeda, N. (2004): *Guide to the Amphibians and Reptiles of Japan*. Florida, Krieger Publishing Company.
- Lee, J.C. (2000): *A Field Guide to the Amphibians and Reptiles of the Maya World: The Lowlands of Mexico, Northern Guatemala, and Belize*. New York, Cornell University Press.
- Lue, K.Y., Tu, M.C., Shang, G.S. (2002): *The Transition Kingdom — Guidebook of Amphibians and Reptiles of Taiwan*. Taipei, SWAN. (In Chinese)
- Meshaka, W.E. Jr., Butterfield, B.P., Hauge, J.B. (2004): *The Exotic Amphibians and Reptiles of Florida*. Florida, Krieger Publishing Company.
- Norval, G., Mao, J.J. (2007): Can *Anolis sagrei* be unintentionally transported to new localities in bamboo stem bundles? *Sauria* **29**: 51-54.
- Shang, G.S., Lin, S.L. (2001): *Natural Portraits of the Lizards of Taiwan*. Taipei, Big Trees Publishers. (In Chinese)
- Spawls, S., Howell, K., Drewes, R., Ashe, J. (2002): *A Field Guide to the Reptiles of East Africa*. London, Academic Press.