HERPETOTROPICOS Vol. 9(1-2):47-53

ISSN 1690-7930 (Printed) ISSN 1856-9285 (Online)

OVIPOSITIONAL BEHAVIOR OF *OTOCRYPTIS WIEGMANNI* (REPTILIA: AGAMIDAE: DRACONINAE)

B.S.A.T. HIRANYA SUDASINGHE[1,3] AND T.G. THARAKA KUSUMINDA[1,2]

[1] *Young Zoologists' Association of Sri Lanka, Department of National Zoological Gardens, Dehiwala, Sri Lanka.*

[2] *Department of Export Agriculture, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka, Belihuolya.*

Abstract: This note describes the first detailed oviposition behavior of the endemic Kangaroo Lizard, *Otocryptis wiegmanni,* in Sri Lanka. Aspects of digging the nest hole, egg laying, burying and packing of the eggs, tight compression of the soil and camouflaging the nest are discussed. Further notes on "test nesting" behavior, eggs and hatchlings of the lizard are also provided.

Keywords: Agamidae, *Otocryptis wiegmanni*, egg laying, Conservation, Sri Lanka.

Resumen: B.S.A.T. Hiranya Sudasinghe y T. G. Tharaka Kusuminda. "Comportamiento oviposicional de *Otocryptis wiegmanni* **(Reptilia: Sauria: Agamidae)".** Esta nota describe el primer comportamiento detallado de oviposición de la lagartija canguro, *Otocryptis wiegmanni*, endémica de Sri Lanka. Se discuten aspectos de cavar el agujero del nido, puesta de huevos, enterramiento y empaquetado de los huevos, compresión apretada del suelo y camuflaje del nido. También se proporcionan más notas sobre el comportamiento de "prueba de anidación", huevos y crías recién nacidas de la lagartija.

Keywords: Agamidae, *Otocryptis wiegmanni*, postura de huevos, Conservación, Sri Lanka.

INTRODUCTION

Sri Lanka is a biodiversity hotspot together with the Western Ghats of Southern India and the area is rich in herpetofaunal assemblages (Bossuyt *et al*. 2004, Meegaskumbura *et al*. 2002, Myers *et al*. 2000). Eighteen species of agamid lizards live in Sri Lanka, including three endemic genera and 15 (83%) endemic species (Bahir and Surasinghe 2005, Somaweera and Somaweera 2009). These 18 species belong to six genera: *Calotes*, *Ceratophora*, *Cophotis*, *Lyriocephalus*, *Otocryptis* and *Sitana*. The genus *Otocryptis* is represented by two species in Sri Lanka, *Otocryptis wiegmanni* Wagler, 1830 and *Otocryptis nigristigma* Bahir *et* Silva, 2005. Sri Lanka Kangaroo Lizard, *O. wiegmanni* is widely distributed throughout the wet zone of Sri Lanka from sea level to 1300m a.s.l (Manamendra-Arachchi and Liyanage 1994, Somaweera and Somaweera 2009). This species is found in both natural and anthropogenic habitats in which there is adequate leaf litter and shade, and mainly feeds on ants, ground moths, grasshoppers, spiders and beetles (Somaweera and Somaweera 2009), but may occasionally take plant materials like tender shoots (Deraniyagala 1953) and small geckos (de Silva *et al*. 2004). Males are known to show territorialism and fight toward invading males by inflating the dewlap (Karunarathna and Amarasinghe 2008, Somaweera and Somaweera 2009).The species is listed under the 'Least Concern' category in the National Red List 2012 (MOE2012). Despite being a widespread species, little information is available on its natural history. Here we describe the ovipositional behavior of *Otocryptis wiegmanni* and some notes on its "test nesting" behavior, eggs and hatchlings.

MATERIALS AND METHODS

Observations were made by the naked eye at a distance of 2- 2.5 m without making any disturbance. Geographic coordinates were taken from GARMIN® Etrex GPS device. A digital thermometer and a digital hygrometer were used to measure temperature and relative humidity. Measurements of the eggs and hatchlings were obtained to the nearest 0.1mm by a vernier caliper and the eggs were carefully deposited in the same orientation back in the original nest hole. The diagnostic keys and characters given by Bahir and Silva(2005) were used for the identification of species. The vegetation and habitat identifications were based on Ashton *et al*. (1997).

STUDY AREA AND HABITAT

The observations were made at three study sites in Sri Lanka: Belihuloya, Ratnapura District, Sabaragamuwa Province (Observation 1; 6°42'14"N and 80°47'29"E, 586 m a.s.l.); Dombagaskanda Forest Reserve (DFR), Kalutara District, Western Province (Observations 2, 4 and 5; 6°43'29"N 80°9'27"E, 40m a.s.l) and Madakada Forest Reserve (MFR), Kalutara District, Western Province (Observation 3;

[3] Send correspondence to / *Enviar correspondencia a*: hsudasinghe@gmail.com

Received / *Recibido:* 15 MAY 2013
Accepted / *Aceptado:* 15 JUL 2013
Published / *Publicado:* 31 JUL 2013

6°45'26"N and 80°11'16"E, 90m a.s.l). Vegetation type at Observation 1 was Dry-Mixed Evergreen Forest dominant with *Vitex* (Family: Lamiaceae), *Mangifera* (Family: Anacardiaceae) community mixed with Riverine Forestland grassland. The vegetation type of DFR and MFR were lowland tropical evergreen forest. The dominant tree species was *Madhuca fulva* (Family: Sapotaceae), *Mangifera zeylanica* (Family: Anacardiaceae), *Dipterocarpus zeylanicus* (Family: Dipterocarpaceae), *Mesuaferrea* (Family: Clusiaceae), and *Shorea zeylanica* (Family: Dipterocarpaceae). Table 1 provides some ecological parameters during the observations.

RESULTS

The ovipositional behavior of *O. wiegmanni* consisted of digging the hole nest, laying the eggs, burying the eggs and camouflaging the nest and the behavior is presented below.

Female 1 (Observation 1): A mature female *Otocryptis wiegmanni* was found lying on the ground close to a stream margined by a fragmented forest in Belihuloya approximately 500m distance from Faculty of Agricultural Sciences of Sabaragamuwa University of Sri Lanka in Rathnapura District, Sabaragamuwa Province, Sri Lanka on 23 February 2012, at about 1150hrs (Observation1).The soil was wet, soft and sandy and very little undergrowth and no leaf litter.

The lizard was observed while it was excavating the nest hollow. While digging the nest hole, it placed its head totally inside the cavity. It continued digging the ground while scraping the soil with its forearms one after the other, without turning its body. It continued to dig the hole for about further 22 minutes, stopping nine more times for rest and observe around. During resting it looked around for average of 120s-180s while repeatedly turning its head about 90^0 three times, without moving its body. The proximal part of tail was kept parallel and close to the ground, while the distal part was curved upwards. The limbs stretched out bent at knees, abdomen touching the ground, and belly appearing dark reddish color, while body color being a darker brown morph. After digging the nest hole, it reached to other side of the hole. It placed the posterior part of its body at the opening of the hole-nest and the tail was kept straightened above the hole. While laying eggs it lifted its limbs and placed its limbs at the opposite sides of the nest hole. Head and breast were kept above the ground without touching the ground during the whole period. Four eggs were laid at a rate of one in every 135s. After egg-laying, female stayed without any movement, resting for about 10 minutes. After resting time, female turned 360^0 counter clockwise and crept back into the hole-nest to pack and place the eggs below ground level for two times with few seconds interval, using the anterior part of its lower jaw. Then it stayed without any movement looking around for about two minutes. It began to drag the soil towards the hole using its hands one after the other. After dragging the soil it turned 180^0 counter clockwise and started pressing the soil with the tip-of-snout and anterior half of its lower jaw. It spent nearly an hour in this event, while observing around after each time of dragging the soil and pressing the soil. The hole was completely filled up to the ground level. The lizard did not do anything to camouflage the nesting site. It remained motionless for nearly three minutes and then moved slowly towards the water stream and entered into theforest crossing the water stream.

Female 2 (Observation 2): Another mature female *Otocryptis wiegmanni* was found lying on the ground (Fig. 1A) on a road inside the DFR on 04 April 2012 at about 1130hrs. There was low level of leaf litter and soil consisted of mainly gravel and sand (Fig. 1B). The digging of the nest hole was similar to that of female 1. The female continued to dig the hole for about further 12min, stopping five times to rest and observe the surroundings. Each digging behavior continued for about 18s (n=6), with a longer resting period (~120s) in between two consecutive digging processes. The proximal part of tail was kept parallel and close to the ground, while the distal part was curved upwards. The limbs stretched out bent at knees, abdomen touching the ground, and belly appearing dark reddish color, while body color being a darker brown morph. Contraction in abdomen was seen.The lizard changed in posture, body was more inclined to the ground than previously (~45^0 with the ground). The forearms were placed in front of the hole on either side and bent at the elbows; body was lifted from ground. Left limb was placed outside, while the right limb was placed inside the hole. Tail lying on the ground flat and distal part curled upwards. Head and breast were kept above the ground without touching the ground during the whole period. Three eggs were laid at a rate of one in every ~ 90s. During egg laying, two humans passed very close by, but the lizard was not disturbed. In between the egg laying it stayed in the same posture. After egg laying, the female stayed without any movement for about 180s. The lizard showed a sudden change in posture like a jerk, moved backwards and started to pack and place the eggs in the hole. Packing was done using the tip of snout and anterior half of its lower jaw. The packing process was more rapid and the head moved up and down faster than during the digging of the hole. Forearms were used to drag soil into the hole, using one arm at a time. Each packing of the eggs using the head usually lasted for ~ 3-4s, which was followed mostly by a resting interval for about 10-20s or followed by dragging of soil towards the hole using either left or right forearm. It also changed its position by turning 180^0 for ~7 times and 90^0 for two times. After repeating this behavior for about 30min, it suddenly ran away for about 25cm and fed on an ant on the ground and climbed a small log and caught another ant, ate it and moved back to the hole which had been almost covered by now. The tail was lifted, continued packing and dragging soil for additional five minutes.The nesting site was finally camouflaged by dragging small sticks and pebbles towards the hole (Fig. 1E). Started to drizzle, the nesting site had been perfectly camouflaged (Fig. 1F); the lizard climbed a small tree for about 4-5cm and rested for about 30s. Then it jumped down and moved and climbed a rock and rested.

Female 3 (Observation 3): The female was observed on 25 July 2012 at MFR at around 1045hrs egg-laying on a sandy footpath frequently used by the monks inside the monastery. Soil mainly consisted of sand with gravel (Fig. 1C). Very little undergrowth and no leaf litter (Fig. 1D). Three eggs were laid during the process (Fig. 2C). The oviposition behavior was similar to the Observations 1 and 2.

FIG. 1. A) Female *Otocryptis wiegmanni* digging the nest (Obs2, DFR); B) Laying the eggs (Obs2, DFR); C) Packing and compressing the eggs (Obs3, MFR ©Gayan Edirisinghe); D) Filling the nest hole (Obs3, MFR ©Gayan Edirisinghe); E) Camouflaging the nest (Obs2, DFR); F) The nest after camouflaged (Obs2, DFR).

A) *Hembra* Otocryptis wiegmanni *excavando el nido (Obs2, DFR); B) Depositando los huevos (Obs2, DFR); C) Empaquetando y comprimiendo los huevos (Obs3, MFR ©Gayan Edirisinghe); D) Llenando el hueco del nido (Obs3, MFR ©Gayan Edirisinghe); E) Camuflando el nido (Obs2, DFR); F) El nido después del camuflaje (Obs2, DFR).*

Female 4 (Observation 4): On 14 December 2011 we observed a test nesting behavior of a mature female *O. wiegmanni* at DFR at around 16:30hrs.

"Test Nesting Behavior" (Observation 4)

When walking along the road at DFR, we came across an excavated hole on the road (Fig. 2A) and close by, a mature gravid female *O. wiegmanni* (Fig. 2E) was found lying on a small rock along the road at around 1620hrs. Its head and chest was lifted, forearms not bent, hind limbs bent at knees and the tail not lifted. The lizard remained in this posture holding to the rock while looking around by rotating its head for about 10min. Suddenly, it jumped off and sprinted ~6.7m to the other side of the road, fed on an ant on leaf litter and moved to a rock and rested. It remained in this resting posture for about 40min while rotating its head ~30^0 to 45^0 to look around. During this resting posture two humans and one vehicle passed close by but the lizard was not disturbed. Then it moved into the forest, climbed onto a branch and rested. When we searched the ground further we found out that two holes have been dug by the lizard (Fig. 2B). The distance between the two dug holes were 65cm and the depth and diameter of the two holes were 35mm, 22mm and 52mm, 29mm respectively. The distances to the two holes from the initial resting place of the lizard were 206cm and 162cm, respectively.

Eggs and hatchlings

The thin shelled eggs laid by *O. wiegmanni* were pure white and elliptic, and measured an average length of 11.2 mm and a mean width of 7.4 mm at Observation 1, while the average length and width of the eggs laid at MFR (Observation 3) were 11.3mm and 6.5mm respectively (Table 2).

Following some heavy-rainy days, on 25 October 2011 we encountered two eggs on the surface of the road at DFR and two more eggs buried inside (Observation 5). These eggs were incubated and out of these four eggs, three hatched on 31 October 2011 and measured an average SVL of 20.7mm and TL of 40.1mm. These hatchlings (Fig. 2D) were then released back into the same area.

DISCUSSION

The recent interest on the oviposition behaviors of Sri Lankan Agamidae has documented the behaviors of all the *Calotes* species in Sri Lanka except *Calotes desilvai* (Amarasinghe and Karunarathna 2007, 2008; Gabadage *et al*. 2009; Karunarathna *et al*. 2009, 2011; Pradeep and Amarasinghe 2009) and *Lyriocephalus scutatus* (Karunarathna and Amarasinghe 2013).

Though *O. wiegmanni* (Fig. 2F) is one of the most widely distributed agamid lizards throughout the wet zone of Sri Lanka, its oviposition behavior has not been documented before. According to Das and De Silva (2005) reproduction of *O. wiegmanni* takes

TABLE 1. Some ecological parameters of the environment and the nests of *Otocryptis wiegmanni* in Sri Lanka.
TABLA 1. *Algunos parámetros del ambiente y los nidos de* Otocryptis wiegmanni *en Sri Lanka.*

	Belihuloya (Obs1)	DFR (Obs 2)	MFR (Obs 3)	DFR (Obs4)	DFR (Obs5)
Month	February	April	July	December	October
Year	2012	2012	2012	2011	2011
Climate Condition	Cloudy	Cloudy	Warm & Sunny	Cloudy	Cloudy & rainy
Time duration	1150hrs to 1336hrs	1130hrs to 1240hrs	1045hrs to 1120hrs	1620hrs to 1740hrs	-
Temperature	Not measured	27.60 ºC to 26.40 ºC	Not measured	26.40 ºC to 25.70 ºC	-
Relative Humidity	Not measured	90-96%	Not measured	80-85%	-
Soil	Sandy	Gravel and Sandy	Sandy	Gravel and Sandy	Gravel and Sandy
Leaf litter	Not covered	Few	Not covered	Not covered	Not covered
Canopy Cover (%)	40%	55.5%	75%	90%	60%
Depth of the hole (mm)	59.5 mm	Not measured	31mm	35mm & 52mm	-
Diameter of the hole (mm)	31.5 mm	Not Measured	Not measured	22mm & 29mm	-
No. of eggs in the clutch	Four	Three	Three	Not laid	Four

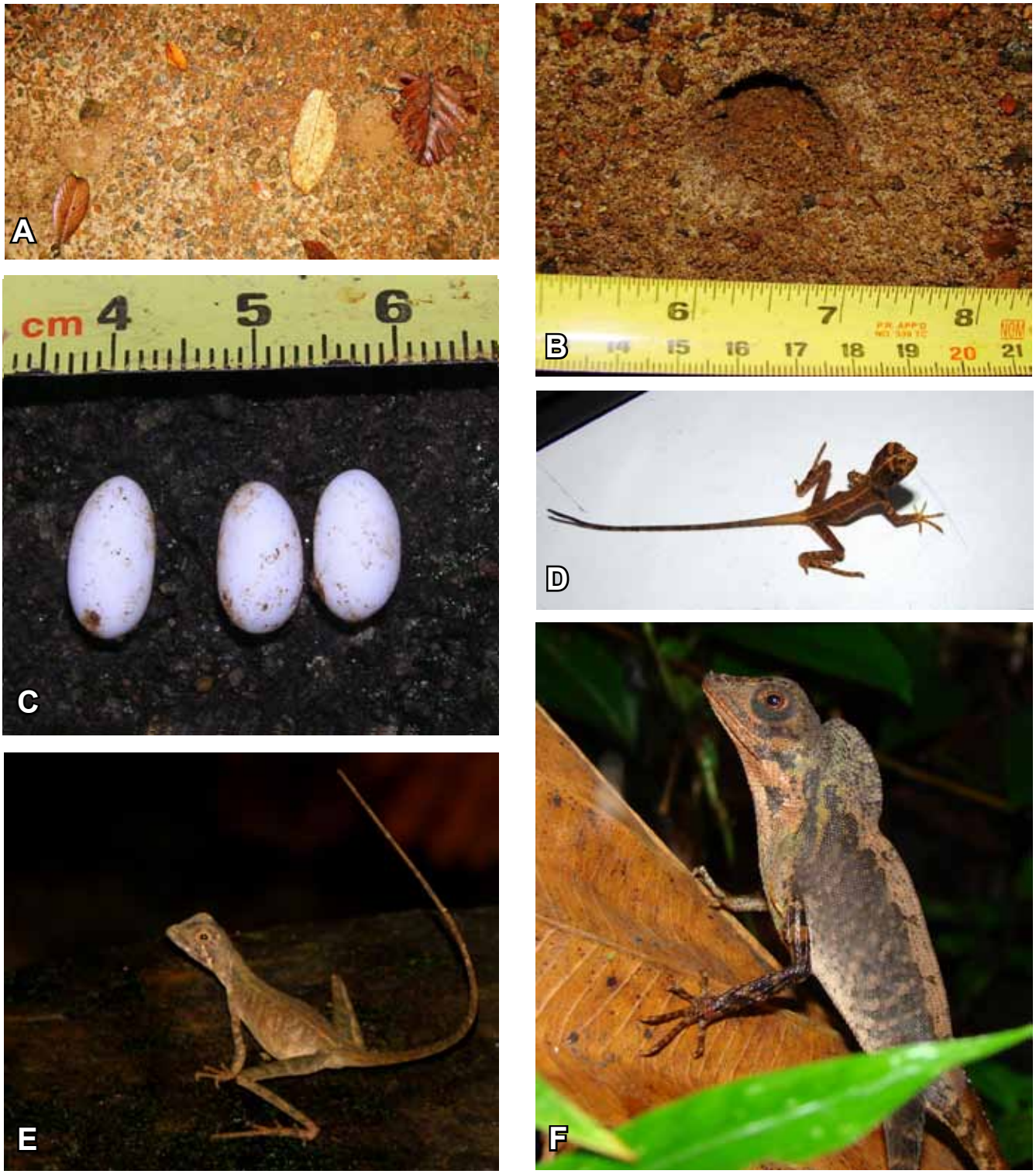

FIG. 2. A) Two test nests of *Otocryptis wiegmanni* Obs4, DFR); B) Test nest hole of O. wiegmanni (Obs4, DFR); C) Eggs of O. wiegmanni (Obs3, MFR ©Gayan Edirisinghe); D) Hatchling of O. wiegmanni (Obs5, DFR); E) Adult gravid female O. wiegmanni observed during Test Nesting (Obs4, DFR); F) Adult male O.wiegmanni at DFR.

A) Dos nidos de prueba de Otocryptis wiegmanni *(Obs4, DFR); B) Hueco de nido de prueba de O. wiegmanni (Obs4, DFR); C) Huevos de O. wiegmanni (Obs3, MFR ©Gayan Edirisinghe); D) Ejemplar eclosionado de O. wiegmanni (Obs5, DFR); E) Hembra adulta grávida de O. wiegmanni observada durante nidada de prueba (Obs4, DFR); F) Macho adulto de O. wiegmanni en DFR.*

place between July and January, with a peak between October and January. However, we have observed hatchlings on the forest floor throughout the year and egg laying behavior in February and April, therefore it is possible that its reproduction takes place throughout the year if the required conditions are met.

Based on our observations it seems that the period of oviposition of *O. wiegmanni* extends from the late morning (10:00hrs) to the afternoon (16:00hrs). This is also the period recorded for oviposition behavior of almost all the *Calotes* thus far documented in Sri Lanka.

When comparing the oviposition behavior of *O. wiegmanni* with oviposition behaviors of other *Calotes* spp. documented in Sri Lanka, *O. wiegmanni* places posterior part of its body over the hole while laying eggs and also stretch the posterior part of its body similar to that of *C. ceylonensis* (Pradeep and Amarasinghe 2009). However, *C. liocephalus* places the posterior part of the body inside the hole while laying eggs, *C. versicolor* places its cloacal aperture over the opening while laying eggs, *C. nigrilabris* places the posterior part of its body at the mouth of the nest-hole while hind limbs were lifted a little, but not stretched horizontally like that of *C. calotes* and *C. liolepis* (Karunarathna *et al*. 2011). *O. wiegmanni* do not create a body pit to dig the nest hole which is similar to *C. calotes*, *C. liocephalus*, and *C. versicolor.* However, *C. ceylonensis*, *C. liolepis*, and *C. nigrilabris* finely create their body pits (Karunarathna *et al*. 2009, Pradeep and Amarasinghe 2009). During oviposition, *O. wiegmanni* usually lifts the anterior part of the body with its forelimbs while turning its head to look around similar to that of *C. versicolor* (Amarasinghe and Karunarathna 2007). The tail of *O. wiegmanni* is placed parallel to the ground and slightly coiled and lifted at the posterior end which is different from the *Calotes* sp. documented in which the tail is coiled around the outer margin of the nest hole, or placed inside the nest hole (Amarasinghe and Karunarathna 2007, 2008; Gabadage *et al*. 2009; Karunarathna *et al*. 2009, 2011; Pradeep and Amarasinghe 2009). Similar to *C. ceylonensis* and *C. liocephalus* (Amarasinghe and Karunarathna 2008, Pradeep and Amarasinghe 2009) *O. wiegmanni* places the eggs softly without making any noise. *C. liolepis, C. nigrilabris, C. calotes* and *C. versicolor*, however, are known to make a knocking noise while packing and placing the eggs in the hole using its lower jaw (Amarasinghe and Karunarathna 2007, Gabadage *et al*. 2009).

Based on our personal observations and those of Edirisinghe and Sudasinghe (2013), it seems that *O. wiegmanni* prefers a sandy, gravel soil to lay eggs. This may be due to the easiness of digging the loose sandy soil over other rough terrains. Gravel, sandy soil is mostly found in the roads inside the forests. Except for observation 1, all the other observations we made were on such roads. With development increasing day by day, vehicles will more frequently use these roads. For example, the road at DFR leading to the monastery inside the forest is daily used by vehicles.Therefore, it is possible that the number of road kills would increase for both adults and hatchlings and even eggs (Observation 5; after heavy rains when the soil was washed away, the eggs were exposed onto the surface of the road).It can also be argued that such disturbances create more and more nesting places for these lizards.

Most animals select nest sites non-randomly, reflecting benefits of specific locations or incubation conditions for offspring viability as well as risks or costs to the reproducing adult (Somaweera and Shine 2012) and "test nesting" are a known strategy among some reptiles. It is known that some species of reptiles dig holes close to the eventual oviposition site, but abandon the attempt before laying (Somaweera and Shine 2012) and our observation of "test nesting" of *O. wiegmanni* could be a similar behavior.

Though Sri Lanka is rich in herpetological diversity, our knowledge on the biology and ecology of their reptiles is very much limited. Hence, there is a clear need to undertake long term ecological research that could contribute to effective conservation and management planning.

ACKNOWLEDGMENTS

We are grateful to Dr.RuchiraSomaweera and Mr. Suranjan Karunarathna for providing valuable comments in preparing the manuscript. We would like to express our gratitude to two anonymous reviewers for their critical comments. We are grateful to Mr. Gayan Ediringhe for providing the photographs for Fig.1-C and Fig.1-D. Finally, to Mr. Hasantha Wijethunga for his help in preparing the figure plates.

REFERENCES

Amarasinghe, A.A.T. and D.M.S.S. Karunarathna.2007. Beobachtungen zum Eiablageverhalten derIndischen Schönechse *Calotes versicolor* (Daudin, 1802)(Reptilia: Agamidae) in einem anthropogenen Biotop in SriLanka.Sauria29(3):27–30.

TABLE 2. Measurements (in mm) of the eggs of *Otocryptis wiegmanni* (n=7).
TABLA 2. *Medidas(en mm) de los huevos de* Otocryptis wiegmanni *(n=7).*

	Egg measurements									
	Egg 1		Egg 2		Egg 3		Egg 4		Average	
	length	width	length	width	length	width	length	width	length	width
Belihuloya (Obs1)	11.1	7.5	11.1	7.4	11.6	7.1	10.9	7.5	11.2	7.4
MFR (Obs3)	10.9	6.5	11.2	6.6	11.9	6.4	-	-	11.3	6.5

Amarasinghe, A.A.T. and D.M.S.S. Karunarathna.2008. Observation on the oviposition behavior of theCrest-less Lizard *Calotes liocephalus* (Reptilia: Agamidae) in the Knuckles forest region of Sri Lanka. Asiatic Herpetological Research 11:13–16.

Ashton, M., C.V.S. Gunatileke, N. De Zoysa, M.D. Dassanayake, N. Gunatileke and S. Wijesundara.1997. A Field Guide to the Common Trees and Shrubs of Sri Lanka. Wildlife Heritage Trust of Sri Lanka, Colombo. 432pp.

Bahir, M.M. and A. Silva. 2005. *Otocryptis nigristigma*, a new species of agamid lizard from Sri Lanka. *In* D.C.J. Yeo, P.K.L. Ng and R. Pethiyagoda (eds.). Contributions to biodiversity exploration and research in Sri Lanka. Raffles Bulletin of Zoology, Supplement 12:393-406.

Bahir, M.M. and T.D. Surasinghe. 2005. A conservation assessment of the agamid lizards of Sri Lanka. *In* D.C.J. Yeo, P.K.L. Ng and R. Pethiyagoda (eds.). Contributions to biodiversity exploration and research in Sri Lanka. Raffles Bulletin of Zoology, Supplement 12:407– 412.

Bossuyt, F., M. Meegaskumbura, N. Beenaerts, D.J. Gower, R. Pethiyagoda, K. Roelants, A. Mannaert, M. Wilkinson, M.M. Bahir, K. Manamendra-Arachchi, P.K.L.Ng, C.J. Schneider, O.V. Oommen and M.C. Milinkovitch. 2004. Local endemism within the Western Ghats – Sri Lanka Biodiversity Hotspot. Science 306:479–481.

Das, I. and A. De Silva.2005. Snakes and Other Reptiles of Sri Lanka. New Holland Publishers.144pp.

De Silva, A., A.M. Bauer, A. Drion, A. Fabry, S. Goonawardena, Z. Hawke and V. Vanneck.2004. *Otocryptis weigmanni* (Reptilia: Agamidae): A gecko predator at Nilgala Fire Savannah, Sri Lanka. Gekko 4(1):15-17.

Deraniyagala, P.E.P. 1953. A Colored Atlas of Some Vertebrates from Ceylon. Vol. 2. Tetrapod Reptilia, National Museums of Sri Lanka, Colombo. 101pp.

Gabadage, D.E., A.A.T. Amarasinghe and M.M. Bahir.2009. Notes on the ovipositional behavior of *Calotes calotes* (Linnaeus, 1758) (Reptilia: Agamidae) in Sri Lanka. Herpetotropicos 5(1):21–24.

Edirisinghe, G.M. and B.S.A.T.H. Sudasinghe. 2013. An observation of ovivory in the Sri Lanka Wolf Snake *Cercaspis carinatus* (Kuhl,1820). Sauria 35(1):54-56.

Karunarathna, D.M.S.S. and A.A.T. Amarasinghe. 2008. Notes on the territorial behavior of *Otocryptis wiegmanni* Wagler,1830 (Reptilia: Agamidae: Draconinae). Herpetotropicos 4(2):79-83.

Karunarathna, D.M.S.S. and A.A.T. Amarasinghe. 2013. Behavioral ecology and microhabitat use by *Lyriocephalus scutatus* (Linnaeus, 1758): a monotypic genus in Sri Lanka (Reptilia: Agamidae: Draconinae) with notes on the taxonomy. Russian Journal of Herpetology 20(1):1-15.

Karunarathna, D.M.S.S., I.N. Bandara and A.W.A. Chanaka. 2009. The ovipositional behavior of the endemic whistling lizard *Calotes liolepis* Boulenger, 1885 (Reptilia: Agamidae) in the Knuckles forest region of Sri Lanka. Acta Herpetologica 4(1):47–56.

Karunarathna, D.M.S.S., W.A.A.D.G. Pradeep, P.I.K. Peabotuwage and M.C. De Silva.2011. First Report on the ovipositional behavior of *Calotes nigrilabris* Peters, 1860 (Reptilia: Sauria: Agamidae) from the Central Massif of Sri Lanka. Russian Journal of Herpetology 18(2):111-118.

Manamendra-Arachchi, K. and S. Liyanage 1994. Conservation and distributions of the agamid lizards of Sri Lanka with illustrations of the extant species. Journal of South Asian Natural History 1(1):77–96.

Meegaskumbura, M., F. Bossuyt, R. Pethiyagoda, K. Manamendra-Arachchi, M.M. Bahir, M.C. Milinkovitch and C.J. Schneider. 2002. Sri Lanka: an amphibian hotspot. Science 298:379.

MOE. 2012. The National Red List 2012 of Sri Lanka; Conservation Status of the Fauna and Flora. Ministry of Environment, Colombo, Sri Lanka, viii + 476pp.

Myers N., R.A. Mittermeier, C.G. Mittermeier, G.A.B. Da Fonseka, and J. Kent.2000. Biodiversity for conservation priorities.Nature 403:853–858.

Pradeep, W.A.A.D.G. and A.A.T. Amarasinghe. 2009. Ovipositional behavior of *Calotes ceylonensis* Müller, 1887 (Reptilia: Agamidae) observed in the Central province of Sri Lanka.Taprobanica 1(1):24–27.

Somaweera R. and N. Somaweera.2009. Lizards of Sri Lanka: A Color Guide with Field Keys, Edition Chimaira. Germany. 303pp.

Somaweera, R. and R. Shine. 2012. Nest-site selection by crocodiles at a rocky site in the Australian tropics: Making the best of a bad lot. Austral Ecology 38(3):313-325. doi: 10.1111/j.1442-9993.2012.02406.x