

## NOTES ON THE NATURAL HISTORY OF SOME LIZARDS IN THE REMAINING FOREST PATCHES OF CAVITE, LUZON ISLAND, PHILIPPINES.

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### ABSTRACT

Twenty-nine species of lizards, belonging to four families, were recorded in the remaining forest patches of Cavite Province, Luzon Island, Philippines. The family Agamidae is represented by 4 species, Gekkonidae by 9 species, Scincidae by 14 species, and Varanidae by 2 species. Fifty-five percent of the species in the area are endemic to the Philippines, indicating the region of Luzon is dominated by forest-obligate species. Fifteen species are diurnal and 13 species are nocturnal including *Brachymeles bonitae* Duméril & Bibron, 1839, *Brachymeles boulengeri boulengeri* Taylor, 1922, and *Brachymeles kadwa* Siler & Brown, 2010. Three major habitats (forest, stream, and human habitation) were occupied by the observed species, with some species appearing to be habitat generalists. Observation accounts include notes on lizard behavior during social interaction, predator avoidance and capture.

**Keywords:** *Cavite, Endemicity, Lizard natural history, Species richness.*

### INTRODUCTION

A full understanding of natural history is considered as one of the essential building blocks for a successful conservation and management of a given herpetofauna (Bury, 2006; Arnold, 2003). It provides us insights into how organisms respond to immediate changes in their habitat. Information on lizard natural history in the Philippines is very limited for some groups (Van Sluys et al., 2004). Other recent publications have generated informations in phylogeny, delineation of biogeographic distribution, lineage diversification, discovery of new species and lizard ecology (Welton *et al.*, 2010a, b, 2009; Siler *et al.*, 2011; Siler & Brown 2010; Siler *et al.*, 2010; Siler *et al.*, 2009;

Linkem *et al.*, 2010a, b, c, 2008; Brown *et al.*, 2010, 2009, 2008, 2007, 2001, 2000, 1999, 1997, 1995a, b, c; Brown 1999, 2007; Gaulke *et al.*, 2007; Diesmos *et al.*, 2005; Ferner *et al.*, 1997). Only taxonomic accounts of lizards along established trails in Mts. Palay-palay Mataas-na-Gulod protected landscape is available for Cavite lizards (Lagat, 2009). Cavite Province is undergoing urbanization (Demographia World Urban Areas, 2011; Population Reference Bureau, 2008), which makes available information on lizard natural history useful for its management and conservation programs. This province is an important area for herpetofaunal researches to observe the effects of anthropogenic activities on lizard ecology. The total land area of Cavite is 142,706 hectares and only 2.87% (0.057% of the remaining forest in the Philippines) remains forested (Forest Management Bureau, 2004). Herpetofaunal documentations thus far have been conducted only in the Palay-palay Mataas-Na-Gulod Protected Landscape, and information from the other parts of Cavite Province remains scarce (Causaren, 2009; Lagat, 2009).

Ecological data are important in formulating conservation strategies, management plans, and ecological models in aid of conservation efforts (Brown *et al.*, 2001; Barbour *et al.*, 2004; Greene, 2005). In Cavite, where herpetofaunal studies are limited and no specific conservation management is implemented for this particular faunal group, information on lizard species richness, distribution and natural history are important (Causaren, 2009; Lagat, 2009).

## **METHODS**

### *Description of the Study Area*

The study area covered the remaining forest patches in the province of Cavite situated in the towns of Indang, Alfonso, Silang, Maragondon, Magallanes and Ternate. Six remaining forest patches were identified. The first forest patch, which is the largest, is Mounts Palaypalay-Mataas na Gulod Protected Landscape. The actual remaining forest cover in the area is estimated at 648 ha. The second area is the Evercrest forest in Amuyong, Alfonso. This forest patch is privately owned by the Puyat family and it is situated in the southern-most part of Cavite also covering Barangay Kaylaway of Nasugbu, Batangas with an area of approximately 4 ha characterized by old-growth primary forest. The third and fourth patches are found in Magallanes, Cavite: the Buhay forest (3<sup>rd</sup>) with 5 ha area and the Pintong Gubat (4<sup>th</sup>) with 1 ha area. Both forests manifest severe disturbance and reforestation areas planted with *Gmelina* and mahogany. The fifth area is the remaining 1 ha

riparian forest patch in barangay Banaba Cerca and Calumpang in Indang. And the last sampling site is the Kabangaan forest patch that borders Cavite and Laguna with an area of 3 ha.

Sampling started November 2009 and continued until August 2010. The remaining forest patches in Cavite were visited several times depending on the area size. Maragondon and Ternate with the biggest forest patches were surveyed five times and Indang with the smallest area was visited twice. Visual searches were employed (Crump and Scott, 1994) and data were recorded on species richness and behavior. All accessible microhabitats were searched by raking the forest floor litter, probing epiphytes and tree hollows, upturning rocks and logs, and splitting-open decayed logs. Diurnal censuses were undertaken between 0800 and 1100 h while nocturnal searches were between 1800 and 2200 h by four observers. All captured animals were identified up to species level, weighed, measured (snout-vent length, SVL, in mm), classified according to sex and age (adult or juvenile), and released at sites of capture.

Voucher specimens were collected according to the specification of the Protected Area and Wildlife Bureau and preserved according to standard techniques (Heyer et al., 1994; Simmons, 2002). Liver tissue was also collected and preserved in 95% ethanol for future DNA analysis.

## **RESULTS AND DISCUSSION**

A total of 29 species belonging to four families were identified in the province of Cavite. Agamidae is represented by 4 species, Gekkonidae with 9 species, Scincidae with 14 species and Varanidae with 2 species. Percent endemicty is 55% where 16 out of 29 are Philippine endemics. With 29 species, Cavite holds the highest lizard species richness among documented areas in Luzon like Aurora (19 species), Zambales (19 species), Balbalasang (16 species) and Makiling (14 species) (Brown *et al.*, 1996; 2000; Diesmos *et al.*, 2005; Lagat, 2009; Siler *et al.*, 2011).

Having observed 25 species out of the total 29 species as forest dwellers (Table 1) is an indication that the remaining forest patches in the province of Cavite are important lizard habitats and must be conserved. These forest patch sizes ranged from 4 ha to 10 ha in the towns of Silang and Indang. In Ternate, Maragondon and Magallanes, forest patches ranged from 100 ha to almost 2000 ha. The only protected forest patches are those that are within Mts. Palay-palay Mataas-na-Gulod Protected Landscape (MPMNGPL) situated in

**Table1.** Species of lizards identified per family in the province of Cavite including habitat distribution, endemcity and activity.

Family/Species	Habitats			Activity	
	Forest	Stream/ River	Man-made structures	Diurnal	Nocturnal
<b>Agamidae</b>					
<i>Bronchocela cristatella</i> (Kuhl, 1820)	√	√		√	
<i>Draco spilopterus</i> Wiegmann, 1834	√	√	√	√	
<i>Gonocephalus</i> sp. *	√	√		√	
<i>Hydrosaurus pustulatus</i> Eschscholtz 1829*		√		√	
<b>Gekkonidae</b>					
<i>Cyrtodactylus philippinicus</i> (Steindachner, 1867) *	√	√			√
<i>Gehyra mutilata</i> (Wiegmann, 1834)	√		√		√
<i>Gekko gecko</i> (Linnaeus, 1758)	√	√	√		√
<i>Gekko mindorensis</i> Taylor 1919 *	√	√	√		√
<i>Hemidactylus platyurus</i> (Schneider, 1792)			√		√
<i>Hemidactylus frenatus</i> Schlegel 1836			√		√
<i>Hemidactylus stejnegeri</i> Ota & Hikida, 1989			√		√
<i>Lepidodactylus lugubris</i> Duméril & Bibron, 1836	√				√
<i>Pseudogekko brevipes</i> Boettger 1897 *	√				√

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Scincidae					
<i>Brachymeles bonitae</i> Duméril & Bibron, 1839 *	√				√
<i>Brachymeles boulengeri boulengeri</i> Taylor, 1922 *	√	√			√
<i>Brachymeles kadwa</i> Siler & Brown, 2010*	√	√			√
<i>Dasia grisea</i> (Gray, 1845)	√		√	√	
<i>Eutropis cumingi</i> Brown & Alcala 1980 *	√	√	√	√	√
<i>Eutropis multicolor borealis</i> (Brown & Alcala, 1980)	√	√		√	
<i>Eutropis multifasciata</i> (Kuhl, 1820)	√	√	√	√	
<i>Lamprolepis smaragdina philippinica</i> (Mertens, 1929)	√	√		√	
<i>Lipinia pulchella pulchella</i> Gray, 1845 *	√			√	
<i>Sphenomorphus coxi divergens</i> Taylor, 1922 *	√	√		√	
<i>Sphenomorphus cumingi</i> (Gray, 1845) *	√	√		√	
<i>Sphenomorphus decipiens</i> (Boulenger, 1894) *	√	√			√
<i>Sphenomorphus jagori jagori</i> (Peters, 1864) *	√	√			√
<i>Sphenomorphus steerei</i> Stejneger, 1908 *	√	√		√	√

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Varanidae					
<i>Varanus cf. olivaceus</i> *	√			√	
<i>Varanus salvator marmoratus</i> (Wiegmann, 1834)	√	√		√	
	25	19	10		

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Maragondon and Ternate while the rest are privately owned. Although already a protected area, problems like illegal logging, illegal hunting, “kaingin” and continuous human encroachment are still observed in the MPMNGPL area (Causaren, 2009).

It is interesting to note that almost all fossorial scincid species are nocturnal. These lizard species were observed to hunt at night and to be absent from their usual retreat places like decaying logs. Rather they were encountered crawling actively in the forest litter hunting for food. Some species, including several skink species, were observed to be active both day and night (Table 1).

The presence of *Varanus cf. olivaceus* in MPNMGL is very interesting. If indeed this species is *V. olivaceus*, this finding will extend the distribution of this lizard farther westward of southern Luzon. There is also the possibility that this may be a new species.

### ***Habits, Habitat and Distribution of Species***

*Bronchocela cristatella* (Kuhl, 1820)

Common name: Green crested lizard

This species was observed to use camouflage as its primary means to avoid predators, usually in the morning while basking, perched on exposed microhabitats like tree trunks, shrubs or sometimes on rocks. This lizard is capable of changing color from brown to green or vice versa depending on its immediate environment. Once discovered, the lizard will remain motionless to avoid further detection or will move to the other side of the tree trunk or shrub where it retreats to hide from the immediate threat. Given the opportunity to escape, the lizard will run very fast until it disappears in the vegetation or litter in the forest floor. This species was observed in the forest habitats in the towns of Ternate, Maragondon and Silang.

*Draco spilopterus* Wiegmann, 1834

Common name: Philippine flying dragon

This species can be observed at night resting on small tree branches or vines. Perched very close to a branch or vine while sleeping, it was noted that individuals also use camouflage preferring vegetation that blends well with its body color, making the lizard appear as if part of the branch or the vine (Khan and Mahmood, 2004). The species is diurnal, and adult male individuals were observed to occupy areas where they can easily get the attention of the

opposite sex. Males perform dewlap display and search for sun patches to make the dewlap appear brighter with sunlight also enhancing wing coloration (Mcguire *et al.*, 2007). In one instance, one male perched on a coconut trunk performing a courtship display was about to be preyed on by *Dendrelaphis caudolineatus*. The lizard froze while the snake move into striking position and escaped by gliding the moment the snake struck. This species was observed in forested and agricultural areas (coconut plantations).

*Gonocephalus* sp.

The majority of the individuals for this species (8 out of 10) were observed during the dry months (November to April). Most individuals of this species were observed in the forest, perched on small tree branches or shrubs to bask. Having the ability to change body color to camouflage itself, this lizard is rarely disturbed by other animals or by people. This is a very secretive species and will avoid any threats including human presence. One female was observed making its nest. Once a favorable site was selected, it made a shallow hole in which two eggs were laid, exposed to the elements. The mother also clears the area of debris in a circular manner within about 15.2 cm in diameter and leaves the nest open. This species is common in the remaining forests of Cavite, Magallanes, Maragondon, Silang and Indang.

*Hydrosaurus pustulatus* Eschscholtz, 1829

Common name: Philippine sail fin lizard

This species is classified under IUCN category of Vulnerable (A2acd+4acde, ver 3.1). Surprisingly, nesting grounds were observed in Indang and Magallanes. This species is now very rare in Cavite, with adult individuals especially difficult to observe. Locally known as “bayagbag”, this lizard is active during the day, basking or foraging on river herb vegetation. Once disturbed, individuals will dive into the water and will remain submerged for a time hiding in debris or rock crevices under water. At night, individuals also seek refuge in areas like thick fern vegetation or rock crevices to sleep.

*Cyrtodactylus philippinicus* (Steindachner, 1867)

Common name: Philippine bent-toed gecko

One of the synonyms of this species is *Gonydactylus philippinicus* (Herpwatch Philippines, 2006; The Reptile Database, 2011). This is a nocturnal species found in areas with good forest cover. In Cavite small patches of old growth forests can still be found in Tagaytay city, and in the

towns of Silang and Maragondon. Temporarily blinded by light, this lizard can be easily captured. This lizard looks for tree holes and decaying logs as retreat during the day.

*Hemidactylus platyurus* (Schneider, 1792)

Common name: Flat-tailed house gecko

This lizard is observed to tolerate human presence as its distribution often includes structures associated with human settlements. Like other gekkonids, this species is nocturnal. It displays social interaction as several individuals gather around light sources like incandescent bulbs and fluorescent lamps positioned to ambush prey insects attracted to light. Once one individual gets too close to one another, the other individual reacts by chasing the intruder away. This behavior may be due to territoriality or opportunity to mate with the female. They exhibit tail autotomy when threatened and will even fall from a ceiling or wall to the ground to escape potential predators. This species is native to Asia and was first documented by Schneider in 1792 and observed to have a wide distribution in the Philippines (Brown and Alcala, 1978).

*Hemidactylus frenatus* Schlegel in Duméril & Bibron, 1836

Common name: Spiny-tailed house gecko

This lizard is very common in human settlements. This species was first documented in Java (Schlegel *in* Duméril & Bibron, 1836) and the first Philippine specimen was described by Cope (1868) as *H. longiceps* (Brown and Alcala, 1978). Being nocturnal, most individuals for this species are commonly observed near artificial light sources like bulbs and fluorescent lamps. This ambush predator patiently waits for possible prey insects attracted to light. Gathering around the light source also is an opportunity for this species for social interaction, where individuals are chasing each other and different courtship gestures from males like chirping and tail strutting may be observed to get the attention of the females. Individuals for this species are easily captured because of familiarity to human presence.

*Hemidactylus stejnegeri* Ota & Hikida, 1989

Common name: Stejneger's leaf-toed gecko

This species is observed in disturbed habitats like secondary growth forest, agricultural plantations and human settlement areas. This is a nocturnal species and observed in tree trunks and lamp posts but prefers dark areas like *G. gecko* and *G. mindorensis*. Observed to be a triploid and parthenogenetic species (Ota and Hikida, 1989; 1985).

*Gehyra mutilata* (Wiegmann, 1834)

Common name: Stump-toed gecko

This nocturnal species' distribution sometimes overlaps with the distribution of the "flat-tailed house gecko", but the majority of the individuals observed were from agricultural or semi-forested areas near human settlements. Not necessarily found in areas with lighting at night, some individuals are observed on the ground running/crawling. This species is also easily blinded by bright light as individuals stop moving when in the path of a flashlight or headlamp.

*Gekko gecko* (Linnaeus, 1768)

Common name: Tokay gecko

This species is widely distributed all over the province both in disturbed and forested areas. Individuals of this species are nocturnal, perching on tree trunks, big branches, lampposts, and sometimes on walls and ceilings. This is an ambush predator, but temporarily blinded by light that can facilitate its capture. Though this species is very secretive, this lizard can be heard as it vocalizes making the sound "tuko...tuko...tuko..."

*Gekko mindorensis* Taylor, 1919

Common name: Mindoro narrow-disk gecko

This species looks very similar to *Gekko monarchus* (Schlegel, 1836), only relatively smaller. Observed individuals for this species prefer habitat like big rocks, shrubs and artificial structures in riparian habitats, and also large trees in the forest. This is a nocturnal species that is very active during the night in areas without artificial lighting. This species also tolerate human presence and occupies habitats like road railings and other artificial structures found in the forest edge. Many individuals were observed in Indang, Maragondon, Alfonso and Silang.

*Lepidodactylus lugubris* Duméril & Bibron, 1836

Common name: Mourning Gecko, Common Smooth-Scaled Gecko

This gekkonid is a nocturnal forest dweller. An individual was collected from a lifted bark of a fallen log in the forest floor. The color of this species is dark brown once it remains in the dark and lightens as it is exposed to light. This species exhibits a complex of parthenogenetic lineages including both diploid and triploid forms as a result of hybridization between *L. moestus* and an undescribed species (Fujita and Moritz, 2009). This species occur in Asia

and Australia. In the Philippines, its distribution includes, Luzon, Palawan and some island in the Visayas like Panay and Cebu. In Cavite, this species was observed only in Maragondon.

*Pseudogekko brevipes* Boettger 1897

Common name: Luzon false gecko

This species was observed in areas with good forest condition like old growth forest patches. Its microhabitat includes leaf axils of aerial ferns and Pandanus (Brown and Alcala, 1978) but in Cavite, individuals were observed perched on branches of trees and shrubs. Individuals exhibit tail autotomy as an escape adaptation. This is a Philippine endemic known to occur in Samar, Negros, Bohol, and Cebu. In Cavite, this species was observed in Alfonso and Maragondon.

*Brachymeles bonitae* Duméril & Bibron, 1839

Common name: Pretty short-legged skink

This is a forest species preferring decaying logs and thick forest litter deposited in the buttresses of large trees. To capture individuals of this species, one must dig or expose decaying log and quickly grab the lizard. Though the species possesses tiny legs, it has the ability to move fast and can quickly retreat to deeper parts of its burrow. Individuals of this species are active during the night and are observed to wander out of its burrows through the thick litter in the forest floor. This is a Philippine endemic and its distribution includes Luzon, Marinduque, Mindoro, Polillo, Sibuyan, Tablas and Masbate Islands (Brown and Alcala, 1980).

*Brachymeles boulengeri* Taylor, 1922

Common name: Boulenger's short-legged skink

This is another fossorial species with habitat distribution overlapping with *B. bonitae*. Another Philippine endemic found in the islands of Luzon, Marinduque, and Polillo (Brown and Alcala, 1980). This is a forest species observed in Alfonso, Maragondon, Ternate and Silang.

*Brachymeles kadwa* Siler & Brown, 2010

Common name: Jessi's slender skink

This pentadactyl species is also fossorial species very similar with *B. boulengeri*. The habitat distribution of this species overlaps with *B. bonitae* and *B. boulengeri*. This species can be observed during the day by digging it

out from the soft decaying materials inside a decaying log or in loose soil under fallen logs, forest floor detritus and leaf litter (Siler *et al.*, 2011). Surprisingly individuals of this species were also observed hunting at night out of its burrow. One individual was observed about to swallow a hairy caterpillar when it was caught and another was probing through leaf litter between tree buttresses. Once disturbed, individuals retreat back into loose soil or humus in a serpentine manner (Siler and Brown, 2010). Individuals of this species were observed in Alfonso, Maragondon, Ternate and Silang extending the range of the species farther west of southern Luzon from its type locality in Aurora Quezon (Siler and Brown, 2010).

*Dasia grisea* (Gray, 1845)

Common name: Gray's tree skink

This is a lowland diurnal species and very elusive. Observed to prefer rock crevices, lifted tree barks and sometimes found near human settlements in forest edges hiding in wood stock-piles, individuals of this species were observed in the towns of Indang and Ternate.

*Eutropis cumingi* (Brown & Alcala, 1980)

Common name: Cuming's mabuya

This species prefer dense forest habitats and may extend up to forest edges occupied by farmers. Interestingly, some individuals are observed to be active both night and day. During heavy rains where soil is waterlogged, individuals are observed to shift from being a forest floor dweller to arboreal. The observation of this species in Cavite extends its range westward most of southern Luzon from its type locality at San Felife in Zambales (Brown and Alcala, 1980). This species was observed in Magallanes and Maragondon in Cavite.

*Eutropis multicolor borealis* (Brown & Alcala, 1980)

During the dry months of the year, this species is very common on the ground, in leaf litter, and basking in exposed areas of the forest. Surprisingly, during the rainy season, this lizard spends most of its time above ground in trees as observed in the study area. This lizard was observed to aggressively pursue insect prey items like butterflies, grasshoppers and small beetles. Its distribution includes Luzon, Masbate, Cebu, Negros, Caluya, Semirara, Sicogon, Gigante North and Gigante South islands (Brown and Alcala, 1980).

*Eutropis multifasciata* (Kuhl, 1820)

Common name: Striped sun skink

This lizard is a diurnal forest species, which can also be found in lowland disturbed forest areas. It is very common in Indang, Magallanes and Alfonso. This lizard is an ovoviviparous animal capable of delivering three litters per year. This lizard behaves like *Eutropis multicolorata* but tolerates more disturbed forest and grassland areas.

*Lamprolepis smaragdina philippinica* (Mertens, 1929)

Common name: Emerald skink

This diurnal lizard is most of the time arboreal. This lizard is commonly observed in low vegetation, in gardens near houses at low elevations. This species likes to bask during bright sun. Once threatened, it will seek the refuge of high branches and move from tree to tree using branches without going down on the ground. This species was also noticed to occur in low vegetation forest (200 to 300 above sea level in the study area). It commonly occurs throughout the Philippines. Individuals were observed in the forest areas in the towns of Ternate, Maragondon, Magallanes, Indang, Silang and Tagaytay city.

*Lipinia pulchella pulchella* Gray 1845

Common name: Beautiful lipinia (Wrobel, 2004)

This is a diurnal forest species most of the time observed on trees and occasionally found on the forest floor. This Philippine endemic occurs in the islands of Luzon and Mindanao (Brown and Alcala, 1980). In Cavite, this species was observed in the towns of Ternate, Maragondon and Silang. During the sunniest time of the day, this lizard likes to bask on fallen logs either found in the forest or along streams. This is a small lizard with two dorsally located bright, yellow stripes from the snout to the end of its tail.

*Sphenomorphus coxi divergens* Taylor, 1922

Common name: Cox's forest skink

This lizard is very similar with *S. jagori* and sometimes mistaken as its juvenile because of its relatively smaller size. This species prefers places near streams or river habitats where it can jump directly into the water when threatened. A very efficient swimmer, it escapes by diving or falling into water and disappears with the flow of the water or retreats to leaf litter and rock crevice for cover to escape threats. This is a Philippine endemic. Its

distribution includes the islands of Luzon, Marinduque and Mindoro (Brown and Alcala, 1980), In Cavite, it was observed only Ternate.

*Sphenomorphus cumingi* (Gray, 1845)

Common name: Cuming's forest skink

This skink prefers mid-elevation forests. This species was observed both in the remaining small patches of primary- and secondary-growth forests in the towns of Magallanes and Maragondon in Cavite. When individuals of this species detect danger, like the other species of *Sphenomorphus*, they remain motionless so as to not attract attention. Camouflages well with leaves and sticks and will not even move even if disturbed to avoid being detected. Once given the chance to escape, it will run very fast and retreat to inaccessible places like logs, burrows, tree holes and rock crevices. This endemic species is found in Luzon, Mindoro, Sibuyan, Sicogon, Panay, Bohol, Dinagat and (Brown and Alcala, 1980).

*Sphenomorphus decipiens* (Boulenger, 1894)

Common name: Black-sided forest skink

This species is observed in forested areas near stream habitats with at least 3 cm-thick leaf litter, both in old growth and secondary growth forests. This species is found in mid-elevation forests preferring forest floor with thick litter and rocky areas. The habitat of this lizard overlaps with *S. jagori*. This is an endemic species and its distribution includes the islands of Luzon, Tablas, Samar, Leyte, and Mindanao (Brown and Alcala, 1980). In Cavite this was observed in forest patches in the towns of Ternate, Maragondon and Silang.

*Sphenomorphus jagori jagori* (Peters, 1864)

Common name: Jagor's sphenomorphus (Conservation International, 2010)

This is a Philippine endemic and found in Luzon, some central Philippine islands and in Mindanao (Brown and Alcala, 1980). This species is common on the open forest floor and along the stream. Most individuals observed in the forest are adults, and surprisingly, many of the specimens observed along the stream are immature or sub-adult differentiated by relatively smaller size and the reddish or pinkish coloration of the tail on the ventral side. It is interesting to note that once this species is confronted with a potential predator, its evasive technique is to blend with the environment and remain motionless, but once given the opportunity to escape, it runs very fast and also a very efficient tree climber.

*Sphenomorphus steerei* Stejneger 1908

Common name: Steere's forest skink

This is the smallest ground-dwelling scincid lizard in the areas of Maragondon and Ternate. Snout-vent-length ranges from 26 – 36 mm, with brown dorsal color having darker dashes along the mid-dorsal line (Gaulke, 2011). Tolerant of a very dry environment, this species can also be observed near water bodies like riverbanks and riparian habitats in forested areas. This species easily disappears within the forest litters, and retreats to burrows and rock crevices for refuge. This Philippine endemic is found in Luzon, Calagnan, Mindoro, Tablas, Gigante South, Sicogon, Ponson, Guimaras, Pasijan, Sibuyan, Poro, Negros, Panay, Siquijor, Cebu, Leyte, Bohol, Camiguin, and Mindanao Islands (Brown and Alcala, 1980).

*Varanus cf. olivaceus*

Locally known as “shabu”, this species is distinct from *V. s. marmoratus*, by being an expert tree climber, and prefers fruits of *Pandanus* sp. This is a diurnal species observed wandering in the forest floor. When disturbed, this elusive lizard will run fast and climb a tree and will not come down even after a long time, observing if the threat is still being a strict forest species, two individuals were observed in the remaining forest patches of Mts. Palaypalay/Mataas na Gulod Protected Landscape in Maragondon and Ternate. To capture the lizards, hunters use hunting dogs or install traps locally known as “latay”, intended to capture monkeys, wild pigs and varanids.

*Varanus salvator marmoratus* (Wiegmann, 1834)

Common name: Common water monitor

This is a very shy lizard that runs fast once it detects a possible encounter with man. Individuals can only be captured through trapping and the use of hunting dogs. This lizard is locally known as “bayawak” or the marbled water monitor lizard. This lizard is prized for its meat as a delicacy and good quality skin that is used in leather crafts. This subspecies is endemic and it is threatened because of commercial hunting (Gaulke, 1992).

## CONCLUSION

Twenty-nine species of lizards were recorded in the remaining forest patches of Cavite, Luzon Island, Philippines, belonging to four families: Agamidae, four species; Gekkonidae, nine species; Scincidae, fourteen

species; Varanidae, two species. Species endemicity (Philippine endemics) for observed species in Cavite is 55% and dominated by forest species. Thirteen species are diurnal, fourteen species are nocturnal and two species were observed to have diurnal and nocturnal activity (*E. cumingi* and *S. steerei*). Three major habitats (forest, stream and human habitation) were occupied by the species and habitat overlaps were observed as some species can occupy all habitat types. The observation of the *Brachymeles* spp. *P. brevipes*, *H. pustulatus*, *E. cumingi* and *V. cf. olivaceus* extend the distributions of this species westward most of southern Luzon. The remaining forest patches in Cavite hold the highest number of lizard species among the documented sites in Luzon.

## LITERATURE CITED

- Alcala, A. C. 1986. Guide to Philippine Flora and Fauna. Vol. 10. Amphibians and Reptiles. Natural Resources Management Center, Ministry of Natural Resources, University of the Philippines. Quezon City, Philippines
- Alcala, E. L., Alcala, A. C., Dolino, C. N. 2004. Amphibians and reptiles in tropical rainforest fragments on Negros Island, the Philippines. *Environmental Conservation* 31: 254–261.
- Alcala, E. L., Paalan, R. B., Averia, L. T., Alcala, A. C. 2004. Rediscovery of the Philippine bare-backed fruit bat (*Dobsonia chapmani* Rabor) on southwestern Negros Island, the Philippines. *Silliman Journal* 45: 123-136.
- Allentoft, M.E. and O'Brien, J. 2010. Global amphibian declines, loss of genetic diversity and fitness: A review. *Diversity*, 2, 47-71.
- Arnold, S.J. 2003. Anniversary essay: Too much natural history or too little? *Animal Behavior* 65:1065-1068.
- Barbour, M.T., Holdsworth, S., and Paulsen, S. 2006. Using ecological data as a foundation in decision-making in the USA. *Limnetica*. 25: 613-622.
- Barrows, C. W. and Allen, M. F. 2007. Persistence and local extinctions of endangered lizard *Uma inornata* on isolated habitat patches. *Endangered Species Research*. 3: 61-68.
- Brennan, E.J. 2008. Reducing the Impact of Global Warming on Wildlife: The Science, Management and Policy Challenges Ahead. Defenders of Wildlife. Washington, D.C.

- Brown R. M., J. Supriatna, and H. Ota. 2000. Discovery of a new species of *Luperosaurus* (Squamata; Gekkonidae) from Sulawesi, with a phylogenetic analysis of the genus and comments on the status of *L. serraticaudus*. *Copeia*. 2000: 191–209.
- Brown, R. M. 2007. Robert Inger's Systematics and Zoogeography of the Philippines. Introduction (pp. 1–24) to 2007 reprint of Inger, R. F. 1954. Systematics and Zoogeography of Philippine Amphibia. (Originally published as Fieldiana: *Zoology* 33(4), Field Museum of Natural History, Chicago). Natural History Publications, Kota Kinabalu
- Brown, R. M. and A. C. Alcala. 2000. Geckos, cave frogs, and small land-bridge islands in the Visayan sea. *Haring Ibon* 2:19–22.
- Brown, R. M. and A. C. Diesmos. 2000. The lizard genus *Luperosaurus*: taxonomy, history, and conservation prospects for some of the world's rarest lizards. *Sylvatrop: Technical Journal of Philippine Ecosystems and Natural Resources* 10:107-124.
- Brown, R. M., J. A. McGuire, J. W. Ferner, N. Icarangal, Jr., and R. S. Kennedy. 2000. Amphibians and reptiles of Luzon Island, II: Preliminary report on the herpetofauna of Aurora Memorial National Park, Philippines. *Hamadryad* 25:175–195.
- Brown, R. M., A. C. Diesmos, and A. C. Alcala. 2001 (2002). The state of Philippine herpetology and the challenges for the next decade. *The Silliman Journal* 42:18–87.
- Brown, R. M., A. C. Diesmos, and M. V. Duya. 2007. A new *Luperosaurus* (Squamata: Gekkonidae) from the Sierre Madre of Luzon Island, Philippines. *Raffles Bulletin of Zoology* 55:167–174
- Brown, R. M., A. C. Diesmos, M. V. Duya, H. J. D. Garcia, and E. L. Rico. 2010. A new forest gecko (Squamata; Gekkonidae; Genus *Luperosaurus*) from Mt. Mantalingajan, southern Palawan Island, Philippines. *Journal of Herpetology*. 44: 37–48.
- Brown, R. M., and A. C. Diesmos. 2001 (2002). Application of lineage-based species concepts to oceanic island frog populations: the effects of differing taxonomic philosophies on the estimation of Philippine biodiversity. *The Silliman Journal*. 42: 133–162.
- Brown, R. M., C W. Linkem, D. Balete, M. V. Duya, A. C. Diesmos, and J. W. Ferner. 2010. Species boundaries in Philippine montane forest skinks (Genus *Sphenomorphus*): three new species from the mountains of Luzon

- and clarification of the status of the poorly known *S. beyeri*, *S. knollmanae*, and *S. laterimaculatus*. *Scientific Publications of the Natural History Museum of the University of Kansas*. 42: 1–27.
- Brown, R. M., C. Oliveros, C. D. Siler, and A. C. Diesmos. 2008. A new *Gekko* from the Babuyan Islands, northern Philippines. *Herpetologica*. 64: 305–320.
- Brown, R. M., C. Oliveros, C. D. Siler, and A. C. Diesmos. 2009. Phylogeny of *Gekko* from the northern Philippines, and description of a new species from Calayan Island. *Journal of Herpetology*. 43: 620–635
- Brown, R. M., D. H. Gist, and D. H. Taylor. 1995a. The home range ecology of an introduced population of wall lizard (*Podarcis muralis*) in Cincinnati, Ohio. *American Midland Naturalist*. 133: 186–102.
- Brown, R. M., D. H. Taylor, and D. H. Gist. 1995b. Effects of caudal autotomy on locomotor performance of wall lizards (*Podarcis muralis*). *Journal of Herpetology*. 29: 98–105.
- Brown, R. M., J. A. McGuire, J. W. Ferner, and A. C. Alcala. 1999. A new diminutive species of skink (Squamata; Scincidae; Lygosominae: *Sphenomorphus*) from Luzon Island, Republic of the Philippines. *Copeia*. 1999: 362–370.
- Brown, R. M., J. F. Ferner, and L. A. Ruedas. 1995c. A new species of lygosomine lizard (Reptilia; Lacertilia; Scincidae; *Sphenomorphus*) from Mt. Isarog, Luzon Island, Philippines. *Proceedings of the Biological Society of Washington*. 108: 18–28.
- Brown, R. M., J. W. Ferner and A. C. Diesmos. 1997. Definition of the Philippine parachute gecko, *Ptychozoon intermedium* Taylor 1915 (Reptilia: Squamata: Gekkonidae): redescription, designation of a neotype, and comparisons with related species. *Herpetologica*. 53: 357–373.
- Brown, R. M., J. W. Ferner, R. V. Sison, P. C. Gonzales, and R. S. Kennedy. 1996. Amphibians and reptiles of the Zambales mountains of Luzon Island, Philippines. *Herpetological Natural History*. 4: 1–17.
- Brown, R. M., R. Fernandez, C. Rivero, R. Buenviaje, and A. Diesmos. 2002. Mt. Isarog's herpetological wonders. *Haring Ibon*. 3: 12–16.

- Brown, R. M., 1999. New species of parachute gecko (Squamata; Gekkonidae; Genus *Ptychozoon*) from northeastern Thailand and Central Vietnam. *Copeia*. 1999: 990–1001.
- Brown, R., Diesmos, A., Alcala, A. 2002. The state of Philippine herpetology and the challenges for the next decade. *Silliman Journal*. 42: 18-87.
- Brown, R., M., J. F. Ferner, and R. V. Sison. 1995. Rediscovery and redescription of *Sphenomorphus beyeri* (Lacertilia; Scincidae) from the Zambales Mountains of Luzon, Philippines. *Proceedings of the Biological Society of Washington*. 108: 6–17.
- Brown, W.C. & A.C. Alcala. 1978 The Philippine Lizard of the Family Gekkonidae. Silliman University. Natural Science Monograph Ser. No. 1, 146p.
- Brown, WC. & A.C. Alcala. 1980. Philippine Lizards of the Family Scincidae. Silliman Univ. Nat. Sci., Dumaguete City, Mon., Ser. No. 2:1-246p.
- Bury, R.B. 2006. Natural history, field ecology, conservation biology and wildlife management: time to connect the dots. *Herpetological Conservation Biology*. 1(1): 56-61.
- Causaren, R. M. 2009. Preliminary report on the anurans of Mts. Palay-palay Mataas na Gulod Protected Landscape, Luzon Island, Philippines. *Philippine Journal of Systematic Biology*. 3: 40-56
- Conservation International. 2010. Project design document under climate, community, and biodiversity standards Edition 1. Forest Carbon Project in Quirino Province Sierra Madre Biodiversity Corridor, Luzon, Philippines
- Corn, P. S. 1994. Straight-line drift fences and pitfall traps. In M. A. Heyer, R. W. McDiarmid, L.-A. C. Hayek, and M. S. Foster, *Measuring and Monitoring Biological Diversity: Standard Methods* (pp. 109–117). Washington, D.C.: Smithsonian Institution Press.
- Crump, M.L. and N.J. Scott, Jr. 1994. Visual encounter surveys. In: Heyer, W.R., M.A. Donnelly, R.W. McDiarmid, L.C. Hayek, M.S. Foster (Eds.). *Measuring and monitoring biological diversity: standard methods for amphibians*. Smithsonian Institution Press, Washington.
- Custodio, C.C. (1986). Altitudinal distribution of lizards of the family Scincidae in Mt. Makiling, Laguna. Sylvatrop Philippines. *Forest Research Journal*. 11:(3 and 4) 181-202.

- Demographia World Urban Areas: 7th Annual Edition. 2011. Retrieved May 2, 2011. <http://www.demographia.com/db-worldua.pdf>
- Diego-Rasilla, F.J. 2003. Influence of predation pressure on the escape behavior of *Podarcis muralis* lizards. *Behavioral Processes*. 63: 1–7.
- Diesmos, A. C. 2008. Ecology and diversity of herpetofaunal communities in fragmented lowland forests in the Philippines . (Unpublished Dissertation, National University of Singapore, Zoology)
- Diesmos, A. C., R. M. Brown, and G. V. A. Gee. 2005. Preliminary report on the amphibians and reptiles of Balbalasang-Balbalan National Park, Luzon Island, Philippines. *Sylvatrop*. 13:(1&2) 63-80.
- Ferner, J.W., R. M. Brown, and A. E. Greer. 1997. A new genus and species of closed canopy forest skinks from the Philippine islands. *Journal of Herpetology* 31:187–192.
- Fujita, M.K. & C. Moritz 2009. Origin and evolution of parthenogenetic genomes in lizards: current state and future directions. *Cytogenet Genome Research*. 127: 261-27
- Galan. P. 2000. Females that imitate males: Dorsal coloration varies with reproductive stage in female *Podarcis bocagei* (Lacertidae). *Copeia*. 2000: 819–825
- Gaulke, M. 1992. Distribution, population density and exploitation of the water monitor lizard (*Varanus salvator*) in the Philippines. *Hamadryad*. 17: 21-27.
- Gaulke, M., H. Roesler, and R. M. Brown. 2007. A new species of *Luperosaurus* (Squamata: Gekkonidae) from Panay Island, Philippines, with comments on the taxonomic status of *Luperosaurus cumingii* (Gray, 1845). *Copeia*. 2007: 413–425
- Gaulke, M. 2011. Checklist of Amphibians and Reptiles. Retrieved May 2, 2011. [http://www.angelfire.com/empire/usc\\_brg/Cebu\\_reptiles.htm](http://www.angelfire.com/empire/usc_brg/Cebu_reptiles.htm)
- Greene, W.H. 2005. Organisms in nature as a central focus for biology. *Trends in Ecology and Evolution*. 20: 23-27.
- Heyer, W. R., Donnelly, M. A., McDiarmid, R. W., Hayek, L.-A. C., Foster, M. S. 1994. Measuring and Monitoring Biological Diversity: Standard Methods for Amphibians. Washington, D.C. USA: Smithsonian Institution Press.

- Johnson, M.A. and Wade, J. 2010. Behavioral display systems across nine *Anolis* lizard species: sexual dimorphisms in structure and function. *Proceedings of the Royal Society B-Biological Sciences*. 277(1688): 1711-1719
- Khan, M.Z. and Mahmood, N. 2004. Study of population status and natural history of agamid lizards of Karachi. *Pakistan Journal of Biological Sciences*. 7(11): 1942-1945
- Lagat, R. D. 2009. A taxonomic account of lizard along established trails in Mts. Palaypalay-Mataas na Gulod Protected landscape, Luzon island, Philippines. *Philippine Journal of Systematic Biology* 3: 17-28
- Linkem, C. A., A. C. Diesmos, and R. M. Brown. 2010a. A new scincid lizard (Genus *Sphenomorphus*) from Palawan Island, Philippines. *Herpetologica*. 66: 67-79.
- Linkem, C. A., K. Hesed, A. C. Diesmos, and R. M. Brown. 2010b. Species boundaries and cryptic lineage diversity in a Philippine forest skink complex (Reptilia; Squamata; Scincidae: Lygosominae). *Molecular Phylogenetics and Evolution*. 56: 572-585
- Linkem, C. W., C. D. Siler, A. C. Diesmos, and R. M. Brown. 2010c. A new species of *Gekko* (Squamata: Gekkonidae) from central Luzon Island, Philippines. *Zootaxa*. 2396: 37-94.
- Linkem, C. W., J. A. McGuire, C. J. Hayden, M. I. Setiadi, D. Bickford, and R. M. Brown. 2008. A new species of bent-toe gecko (Gekkonidae: *Cyrtodactylus*) from Sulawesi Island, eastern Indonesia. *Herpetologica*. 64: 232-242.
- Maranan, R. L. (1999). Distribution patterns of anurans of Mts. Palay-palay Mataas-naGulod National Park, Luzon Island, Philippines. (Unpublished Masters thesis, De La Salle-Manila, Manila, Philippines)
- Marek, C, Bissantz, N., Curio, E., Siegert, A., Tacud, B., and Z. Daniel. 2010. Spatial orientation of the Philippine bent-toed gecko (*Cyrtodactylus philippinicus*) in relation to its home range. *Salamandra*. A 46:(2) 93-97.
- McGuire, J. A., R. M. Brown, Mumpuni, A. Riyanto, and N. Andayani. 2007. The flying lizards of the *Draco lineatus* group (Squamata: Iguania: Agamidae): A taxonomic revision with descriptions of two new species. *Herpetological Monographs*. 21: 180-213.

- Ota H and T. Hikida.1985. A record of members of the parthenogenetic gecko *Hemidactylus garnotii-vietnamensis* species complex, from Taiwan. *Japanese Journal of Herpetology*. 11(2): 52-60.
- Ota H and T. Hikida.1989a. A new triploid *Hemidactylus* (Gekkonidae: Sauria) from Taiwan, with comments on morphological and karyological variation in the *H. garnotii-vietnamensis* complex. *Journal of Herpetology* 23 (1): 50-60.
- Ota H and T. Hikida.1989b. A record of a triploid gecko, *Hemidactylus stejnegeri*, from the northern Philippines, *Japanese Journal of Herpetology* 13(2): 35-39
- Population Reference Bureau. 2008. Retrieved May 2, 2011. [http://www.prb.org/pdf08/pheregionalprofiles\\_calabarzon.pdf](http://www.prb.org/pdf08/pheregionalprofiles_calabarzon.pdf)
- Province of Cavite. 2008. Socio-Economic Profile <http://www.cavite.gov.ph>
- Reed, J.M. 2004. Recognition behavior based on problems in species conservation. *Annales Zoologici Fennici*. 41: 859-877.
- Siler, C. D. 2010a. Reptilia, Squamata, Scincidae, *Brachymeles elerae* (Taylor, 1917): Rediscovery in Old Balbalan, Cordillera Mountain Range, Luzon Island, Philippines, and natural history. *Checklist*. 6: 616–618.
- Siler, C. D., A. C. Diesmos, A. C. Alcala, and R. M. Brown. 2011. Phylogeny of Philippine slender skinks (Scincidae: *Brachymeles*) reveals underestimated species diversity, complex biogeographical relationships, and cryptic patterns of lineage diversification. *Molecular Phylogenetics and Evolution*. 59: 53–65.
- Siler, C. D., A. C. Diesmos, and R. M. Brown. 2010. A new loam-swimming skink, genus *Brachymeles* (Reptilia: Squamata: Scincidae) from the Bicol faunal region, Luzon and Catanduanes islands, Philippines. *Journal of Herpetology*. 44: 49–60.
- Siler, C. D., and R. M. Brown. 2010. Phylogeny-based species delimitation in Philippine loam-swimming skinks (Reptilia: Squamata: Scincidae: *Brachymeles*): taxonomic revision of the pentadactyl species groups and description of three new species. *Herpetological Monographs*. 24: 1–54.
- Siler, C. D., D. S. Balete, A. C. Diesmos, and R. M. Brown. 2010. A new legless loam-swimming lizard (Reptilia: Squamata: Scincidae: Genus *Brachymeles*) from the Bicol Peninsula, Luzon Island, Philippines. *Copeia*. 2010: 114–122.

- Siler, C. D., E. L. Rico, M. R. Duya, and R. M. Brown. 2009. A new limb-reduced skink, genus *Brachymeles* (Reptilia: Squamata: Scincidae), from central Luzon Island, Philippines. *Herpetologica*. 65: 449–459.
- Siler, C. D., J. R. Oaks, J. A. Esselstyn, A. C. Diesmos, and R. M. Brown. 2010. Phylogeny and biogeography of Philippine bent-toed geckos (Gekkonidae: *Cyrtodactylus*) contradict a prevailing model of Pleistocene diversification. *Molecular Phylogenetics and Evolution*. 55: 699–710.
- Siler, C. D., L. J. Welton, J. M. Siler, J. Brown, A. Bucol, A. C. Diesmos, and R. M. Brown. 2011. Amphibians and reptiles, Luzon Island, Aurora Province and Aurora Memorial National Park, Northern Philippines: New island distribution records. *Checklist*. 7: 182–195.
- Simmons, J. E. 2002. Herpetological collecting and collections management. Society for the Study of Amphibians and Reptiles, *Herpetological Circular* 16: 1-70.
- Smart, S.M., Thompson, K., Marrs, R.H., Le Duc, M.G., Maskell, L.C. Firbank, L.G. 2006. Biotic homogenization and changes in species diversity across human-modified *ecosystems*. *Proceeding. Biological Sciences/The Royal Society*. 273: 2659-2665
- Taylor, E.H. 1922. The lizards of the Philippine Islands. Department of Agriculture and Natural Resources, Bureau of Science, Government of the Philippine Islands, Manila, Publication no. 17: 269 pages.
- Van Sluys. M, Ferreira V.M., and Rocha C.F.D. 2004. Natural history of the lizard *Enyalius brasiliensis* (Lesson, 1828) (Leiosauridae) from an Atlantic forest of southeastern Brazil. *Brazilian Journal of Biology*. 64(2): 353-356.
- Welton, L. J., C. D. Siler, D. Bennett, A. C. Diesmos, M. R. Duya, R. Dugay, E. L. Rico, M. van Weerd, and R. M. Brown. 2010a. A spectacular new Philippine monitor lizard reveals a hidden biogeographic boundary and a novel flagship species for conservation. *Biology Letters*. 6: 654–658
- Welton, L. J., C. Siler, A. C. Diesmos and R. M. Brown. 2010b. Philippine bent-toed geckos of the *Cyrtodactylus agusanensis* complex: multilocus phylogeny, morphological diversity, and description of three new species. *Herpetological Monographs*. 24: 55–85.
- Welton, L. J., C. Siler, A. C. Diesmos and R. M. Brown. 2009. A new bent-toed gecko (Genus *Cyrtodactylus*) from southern Palawan Island,

Philippines, and clarification of the taxonomic status of *C. annulatus*.  
*Herpetologica*. 65: 323–343.

Welton, L. J., C. Siler, A. C. Diesmos and R. M. Brown. 2010. Phylogeny-based species delimitation of southern Philippine bent-toed geckos and a new species of *Cyrtodactylus* (Squamata: Gekkonidae) from western Mindanao and the Sulu Archipelago. *Zootaxa*. 2390: 49–68.

Wrobel, M. 2004. Elsevier's Dictionary of Reptiles. Elsevier B.V. Sara Burgerhartstraat 25 P.O. Box 211 1000 AE Amsterdam The Netherlands