

Observation on Ant and Termite Species in the Diet of Malayan Pangolin (*Manis javanica*)

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ABSTRACT. A juvenile Malayan pangolin, *Manis javanica* was found in May 2001. It was caught by hand and ejected a mound of feces. The feces were washed and the residue was kept in 75% ethanol and examined under a stereomicroscope. Ant and termite body parts were found in large quantities. The following species of ants were identified: *Dolichoderus thoracicus*, *D. tuberifer*, *Dorylus vishnui*, *Camponotus (Tanaemyrmex)* sp., *Polyrhachis (Campomyrma) halidayi* and *Oecophylla smaragdina*. In addition the remains of the termite *Termes* sp. were found.

KEY WORDS : *Manis javanica*, ant, termite, Doi Chiang Dao.

INTRODUCTION

The order Pholidota has only one family, the Manidae, with a recent single genus, *Manis*. The genus is comprised of seven living species of pangolin, or scaly anteaters. Pangolin is an armored placental mammal. Some are arboreal but most are ground dwellers. Most species feed at night, sleep during the day and roll into a ball when threatened. There are four species in the tropical Africa and three in Southeast Asia. All three species, *M. javanica*, *M. crassicaudata* and *M. pentadactyla*, are reported from Thailand (Lekagul and McNeely, 1977). Both *M. pentadactyla* and *M. javanica* are completely protected animals of Southeast Asian countries, including Thailand. From our study, it is Malayan

pangolin, *M. javanica* because it has prehensile tail and ear openings (Corbet and Hill, 1992).

As the name compiles, pangolins or scaly anteater feed on burrowing social insects, such as ants and termites. Pangolins locate prey, especially termites, by smelling. Only two species of termites preyed by *M. pentadactyla* reported by Allen since 1938. There are no well-described taxonomic data of which ant species the pangolin hunts upon. Thus, our observation, described in detail here, bring more numbers of documented associations of the Malayan pangolin, *M. javanica* and their prey.

MATERIALS AND METHODS

The pangolins, *M. javanica* are fully protected species under the law of Thailand. Under the Wildlife Protection Act 1992, the penalty for unauthorized trapping, collecting or shooting of protected animals is up to many years' jail, and fine or both. Fortunately, our observation was

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carried out because a juvenile Malayan pangolin, *M. javanica* was found wandering at night from pine/hill evergreen forest of Doi Chiang Dao Wildlife Sanctuary in May 2001. When the animal was caught by hand, it ejected a mound of feces. The feces was washed and rinsed in 75% Ethanol several times leaving only undissolved ant and termite exoskeletons, i.e. a head with one mandible of termite, petiole or fragment of ant body parts. The remaining parts were collected and transported to a laboratory for identification. Collections were sorted into morphospecies under a dissecting microscope, but cannot counted number of individuals or percent found. The specimens were preserved in 75% Ethanol. Since there was no completed body of the ants, some species can be identified to a generic level only.

RESULT

Both ants and termites were found in Malayan pangolin's feces. There were six species from five genera and three subfamilies of ants listed. Only one species of termite was recorded.

DISCUSSION

The Malayan pangolin, *M. javanica*, are found in southeastern Asia within the Indomalayan regions (Corbet and Hill, 1992), including Thailand. A single specimen was reported from Doi Inthanon National Park, approximately 80 km away, by Allen and Coolidge

(1940). It was caught wandering around in the nighttime. When picking up, the animal spewed large amount of semi-liquid feces. This mechanism seems to be another method of defense rather than rolling up its body or using ill-smelling liquid from anal gland.

Allen (1938) points out a close correlation between the range of *M. pentadactyla* and distribution of two abundant species of termites, *Coptotermes formosanus* and *Termes formosanus*. In this study, only the head of *Termes* sp. remained in the feces of *M. javanica*. *Termes* is belonged to Termitidae that distributes in many parts of Thailand (Kirtibutr and Abe, 1997). Therefore, Pangolin regulates termites in nests. There were six species of ants found in the feces of *M. javanica* (Table 1). Many ant species represent food sources for predators because of their large numbers, forage in trail and stationary nests. Ants adopted numerous defenses, including repellent chemicals and soldier castes. On the other hand, predators have methods to over come such defenses. Most vertebrates such as toads, lizards, snakes including anteaters, learn to avoid ants because of their stings and noxious chemical deterrents (Schultz and McGlynn, 2000). A member of Formicinae usually has a large nest with hundreds or thousands of workers that defend their nest vigorously with formic acid sprays (Shattuck, 1999). It is believed that in seeking its food the animal is largely guided by smell as the sight and hearing are apparently poor (Walker, 1964; Yin, 1993). When looking for a termite or ant

Table 1 Ant and termite species found in feces of *Manis javanica*.

Order	Family	Subfamily	Species
Isoptera	Termitidae		<i>Termes</i> sp.
Hymenoptera	Formicidae	Dolichoderinae	<i>Dolichoderus thoracicus</i>
		Dolichoderinae	<i>Dolichoderus tuberifer</i>
		Dorylinae	<i>Dorylus vishnui</i>
		Formicinae	<i>Camponotus(Tanaemyrmex)</i> sp.
		Formicinae	<i>Polyrhachis (Campomyrma) halidayi</i>
		Formicinae	<i>Oecophylla smaragdina</i>

nest; the pangolin first smells around the area rapidly, as if seeking for the best place to begin; it continues sniffing while searching and many occasionally alter its direction. The odor of formic acid produced by Formicinae, *Camponotus* (*Tanaemyrmex*) sp., *Polyrachis* (*Campomyrma*) *halidayi* and *Oecophylla smaragdina*, may guide the animal to find its food. Moreover, Boorer (1971) supposes that the formic acid which ants produce as a defense is not deterrent to a pangolin; indeed the animal could not digest its food properly if this acid was absent because food is not chewed in the mouth and Pangolins completely lack teeth, but passes straight to the stomach which has muscular wall and usually contains small stones. The grinding action of the stomach can be comparable to that of a bird's gizzard.

Camponotus (*Tanaemyrmex*) sp. nests in rotten logs, bamboo tubes left on the ground and rotten part of live trees. *Polyrachis* (*Campomyrma*) *halidayi* nest on tree twigs as well as *Oecophylla smaragdina* that nests on tree. A nest of Dolichoderinae can be found from soil, under rock, termite mound, crack of stones and on tree trunk but members of the genus *Dolichoderus* nest either in the soil or arboreally (Shattack, 1999). *D. thoracicus* and *D. tuberifer* probably nest on the trees. Dorylinae builds its nest mainly in soil and some can be found on tree trunk (Shattack, 1999). *Dorylus* sp. which was found in Doi Chiang Dao, nests in rotten log (Sonthichai, 2000). Some foraging in day or at night, some forage in all times. For these reasons, ants are likely to be a main food resource for the animal.

In conclusion, ants and termites are located mainly by scent. The animal ripping the nest open with claws for all termites and ground dwelling ants; climbing to tree and using long, sticky tongue lapping ants that nest and travel on tree. They also eat some other soft-bodied insects and larvae on occasion.

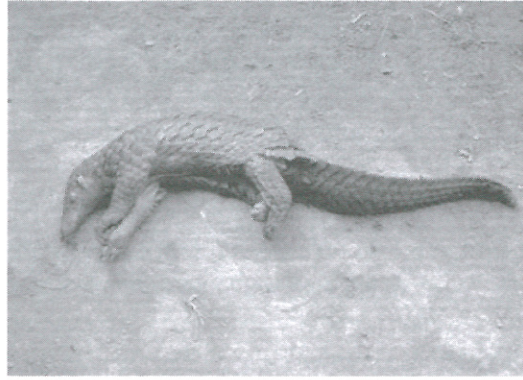


Figure 1 The Malayan pangolin (*Manis javanicus*)

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