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The Electric Rays Found In Thailand

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ABSTRACT

Seven species of Electric rays (Family Torpedinidae) are found in Thai waters ; five species are of the genus *Narcine,* they are *Narcine brunnea* Annandale, *N. prodorsalis* Bessednov, *N. timlei* (Bloch and Schneider), *N. indica* Henle, and *N. maculata* (Shaw). One species each of the *genera Narke* and *Temera,* that is *Narke dipterygia* (Bloch and Schneider) and *Temera hardwickii* Gray.

INTRODUCTION

Before 1975, the electric rays were commonly found in the Gulf of Thailand and in the Andamann Sea, but now they are rarely found in Thai waters. So far, seven species of electric rays were found in Thai waters, while the other neighboring countries reported more or less in number than ours. (Table 1) The author began to study Torpedinids since 1975, after receiving a specimen of unidentified *Narcine* from the Andamann Sea (Phuket province). In October 1980, the auther visited the California Academy of Science in San Francisco where Dr. Tyson R. Roberts introduced the author to Dr. J.V. Campagno, the Elasmobranch expert, he kindly gave me the Russian paper on Electric rays of the genus *Narcine* Henle (Torpedinidae) of the Tonkin Gulf, written by Bessednov (1966). Later the auther found a reference to identify a specimen received in 1975, it was *Narcine prodorsalis* which is a new record for Thailand. The author named this fish in Thai " Pla Kaben Faifah Joodlek " (the electric ray with small spots). The specimen of this fish is housed at the Kasetsart University Museum of Fisheries, Bangkok, Thailand.

SPECIMENS FOUND IN THAI WATERS

Several specimens of electric rays found in Thai waters were examined by the author, received from : (1) the Phuket Marine Biological Center (PMBC), Phuket province ; (2) the National Institute of Coastal Aquaculture (NICA), Songkhla province ; and (3) the Kasetsart University Museum of Fisheries (KUMF), Bangkok. The results of the study indicated that they are all belonged to Family Torpedinidae. Seven species were identified and a key to species had been developed as follows :

Key to species :

1a. One or two dorsal fins present.....2
1b. Dorsal fins absent.... ***Temera hardwickii***
2a. With single dorsal fin.....***Narke dipterygia***
2b. With two dorsal fins.....3
3a. Origin of first dorsal opposite to or slightly behind ends of pelvic bases.....4
3b. Origin of first dorsal in advance of ends of pelvic bases.....6
4a. Color uniform chocolate brown without blotches and spots.....***Narcine brunnea***

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4b. Color brown with blotches and/or spots.....5

5a. Body broader than long ; no large dark blotches, only dark spots about diameter of eye more or less regular shapes.....*Narcine prodorsalis*

5b. Body a little longer than broad or about equal, with large dark blotches, larger than diameter of eye.....*N. timlei*

6a. Body as broad as long ; base ends of pelvic opposite to posterior half of base of first dorsal ; base of first dorsal shorter than base of second one.....*N. indica*

6b. Body broader than long ; base end of plevic opposite to anterior half of base of first dorsal ; base of first dorsal a little longer or about equal to base of second one.....*N. maculata*

Species Description

Temera hardwickii Gray, 1831
(PLATE A, Figure 1)

Temera hardwickii Gray, 1831, Zool, Misc., p. 7 ; Günther, 1870, Cat. Fish. Brit. Mus., 8 : 455 ; Garman, 1913, Mem. Mus. Comp. Zool., 36 : 316 ; Fowler, 1941, U.S. Nat. Mus., 100 (13) : 354.

Disc little wider than long in adult, more or less equal or longer than broad in young. Eyes small, spiracles moderate not fringed, close behind eye. Mouth small, protractile, teeth obtused in narrow bands. Oronasal groove present, cirri absent. Nostrils small, anterior nasal valves confluent, reaching the mouth. Five pairs of small ventral gill-openings. No dorsal fins ; pelvics large, broad, well developed, in male hind margin of pelvics more concave. Tail short, caudal rounded. Skin smooth, naked. Uniform brownish with blackish markings and lighter spots ; whitish below. Fins with light margins.

Distribution : Indonesia, Penang (Malay-Peninsula), Thailand.

Specimens seen : 1 Spec., disc-width 82 mm KUMF 0014 (Phuket, 1965) ; 3 Spec. disc-width 34 - 80 mm KUMF 2916 (Songkhla, 1984)

Narke dipterygia (Bloch and Schneider), 1801
(PLATE A, Figure 2)

Raja dipterygia Bloch and Schneider, 1801, Syst. Ichth : 359.

Astrape dipterygia Day, 1878, Fish. India, p. 734, pl. 192, Fig. 4.

Narke dipterygia Garman, 1913, Mem. Harv. Mus. Comp. Zool., 36 : 313 ; Fowler, 1941, Bull. U.S. Nat. Mus. 100 (13) : 350 ; Munro, 1955, Mar. Freshwater Fish, Ceylon, p. 17 ; Lindberg and Legeza, 1967, Fish. Sea Japan, Sea Okhotsk, and Yellow Sea. 1 : 158. Misra, 1969, Fauna India and adjacent countries, 1 : 223.

Disc round as wide as long ; snout short rounded. Eyes small prominent, about half length of spiracles. Spiracles large close behind eye, Mouth small, protractile ; oronasal groove present ; cirri absent. Nostrils small. One spineless dorsal, rounded along margin, and with elongated base, behind end of pelvics. Pelvics large subtriangular. No anal fin. No serrated caudal spine ; caudal well develop, tail not whip-like, a low lateral keel along its lateral edge. Skin smooth, brownish above with white circular patch on each side behind electric organ ; another above the end of pelvic and generally a third at the base of the caudal. Pelvics with white edge. Lower surface of body whitish. Attain 160 mm in length (Misra, 1969).

Distribution : Yellow Sea, China, Japan, Thailand, Malay-Peninsula, Indonesia, India, Pakistan and Sri-Lanka.

Specimens seen : 1 Spec. disc-width 67 mm KUMF 0807 (Prachuab Khiri Khan, 1968) ; 3 Spec. disc-width 50-84 mm KUMF 0833 (Bay of Bengal, 1971) ; 3 Spec. disc-width 63-66 mm KUMF 0834 (Chonburi, 1972).

Narcine brunnea Annandale, 1909

(PLATE A, Figure 3)

Narcine brunnea Annandale, 1909, Mem. Ind. Mus. 2 : 45 ; Garman, 1913, Mem. Harv. Mus. Comp. Zool. 36 : 300 ; Fowler, 1941, Bull. U.S. Nat. Mus. 100 (13) : 335 ; Munro, 1955, Mar. Freshwater Fish. Ceylon : 17 ; Misra, 1969, Fauna India and adjacent countries 1 : 210.

Disc subcricular, as long as broad. Snout broad, blunt. Eyes small ; spiracles large behind eyes. Mouth small, straight, teeth in narrow band. Oronasal groove present. cirri wanting. Five pairs of small ventral gill openings. Two spineless dorsal fins, first dorsal origin little behing pelvic ends. Pelvics large, longer than broad, triangular end pointed. No anal fin. No serrated caudal spine : tail short, not whip-like ; caudal without lobes.

Back uniform chocolate brown without spots, creamy white below. Margin of disc and edge of fins light Attain 220 mm (Misra, 1969)

This species close to *Narcine timlei* but it is distinguished by uniform coloration while *N. timlei* covered with dark brown spots and patches on back.

Distributions : India, Sri-Lanka, Thailand.

Specimens seen : 5 Spec. disc-width 55-68 mm KUMF 0840 (Bay of Bengal, 1971) ; 1 Spec. disc-width 106 mm KUMF 0841 (Phuket, 1968)

Narcine prodorsalis Bessednov, 1966

(PLATE A. Figure 4)

Narcine prodorsalis Bessednov, 1966, Zool. Chesky Urnal, 45 (1) : 80.

Disc broader than long, snout blunt. Mouth small ; teeth bands narrow ; oronasal groove present, cirri absent. Eyes small about half of spiracle which close behind eye. Five pairs of small ventral gill openings, the largest one near mouth. Two spineless dorsals about the same size. Origin of first dorsal about opposite to ends of base of pelvics. Bases of two dorsals about equal length ; interdorsal space shorter than bases of two dorsals about equal length ; interdorsal space shorter than bases of each dorsals. Caudal moderate, hind margin almost straight, lower angle rounded. Skin smooth, reddish brown with dark spots about diameter of eyes irregular shapes, cover all over above, whitish below.

This species was first described in Russian by Dr. L.N. Bessednov, specimen collected from the Tonkin Gulf, by Pacific Branch of the Institute of Oceanology, USSR Academy of Sciences and Pacific Research Institute of Fishery Management and Oceanography (Vladivostok).

Distribution : Vietnam and Thailand

Specimen seen : 1 Spec. disc-width 170 mm KUMF 2879 (Phuket, 1975)

Narcine timlei (Bloch and Schneider), 1801

(PLATE B, Figure 5)

Raja timlei Bloch and Schneider, 1801, Syst. Ichth. p.359

Narcine timlei Day, 1878, Fish. India, p.733, pl.192, fig. 3 ; Garman, 1913, Mem. Mus. Comp. Zool. 36 : 300 ; Fowler, 1941, Bull. U.S. Nat. Mus. (100) 13 : 334 ; Munro, 1955, Mar. Freshwater Fish. Ceylon, p.17 ; Misra, 1969, Fauna India and adjacent countries, 1 : 214.

Disc nearly circular, snout broadly blunt. Eyes small ; spiracles large, almost twice in diameter of eye, immediately behind eye. Mouth small, straight ; oronasal groove present, cirri wanting. Five pairs of small ventral gill openings. Two dorsal fins, the first dorsal origin behind ends of pelvic bases. Pelvics large, triangular, nearly straight on the hind margin. No anal fins. No serrated caudal spines ; tail not whip-like, a little shorter than length of disc. Lower margin of caudal broadly rounded, hind margin oblique somewhat convex. No caudal pits. Skin smooth ; light brown or reddish brown above with numerous large dark spots, larger than interspaces. Spots sometimes purplish with pale edges. Dorsal and caudal edged with white. Ventral whitish. Attain 340 mm in length. (Misra, 1969)

Distribution : Japan, China, Hong Kong, Philippines, Thailand, Malay-Peninsula, India, Pakistan and Sri-Lanka.

Specimens seen : 1 Spec. disc-width 215 mm KUMF 0012 (Satul, 1938) ; 1 Spec. disc-width 190 mm KUMF 0013 (Trang, 1938) ; 5 Spec. disc-width 80-123 mm KUMF 0836 (Bay of Bengal, 1971).

Narcine indica Henle, 1834
(PLATE B, figure 6)

Narcine indica Henle, 1834, Ueber Narcine, p.35, pl.22, Fig.2 ; Müller and Henle, 1841, Plagios. p.130, Garman, 1913, Mem. Harv. Mus. Comp. Zool. 36 : 299.

Disc about half of total length, subovate. Greatest width about equal distance from snout to vent. Snout moderate broadly rounded in front. Mouth small, teeth bands narrow. Oronasal groove present, cirri wanting. Eyes small ; spiracles much larger than eyes, close behind eye. Five pairs of small ventral gill openings. Two spineless dorsals, subequal upper angles rounded ; origin of first dorsal above ends of bases of pelvics ; hind margin of pelvics slightly concave or nearly straight. Caudal moderate, angles rounded, hind margin obliquely convex. Reddish brown with numerous spots of chocolate color scattered above, whitish below.

In comparison with *Narcine timlei, N. indica* appeared to be less round in the disc ; dorsals differ slightly in shape and first dorsal is inserted farther forward.

Distribution : Malaysia and Thailand

Specimens seen : 1 Spec. disc-width 149 mm KUMF 0838 (Chonburi, 1968) ; 1 Spec. disc-width 115 mm NICA 006 (Pattani, 1984).

Narcine maculata (Shaw), 1804
(PLATE B, Figure 7)

Raja maculata Shaw, 1804, General Zool. 5 (2) : 316.

Narcine maculata Fowler, 1941, Bull. U.S. Nat. Mus. 100 (13) : 333 ; Fowler, 1956, Fish. Red Sea and S. Arabia, 1 : 49 ; Bessednov, 1966, Zool. Chesky Urnal, 45 (1) : 78 ; Misra, 1969, Fauna India and adjacent countries, 1 : 212.

Disc a little longer than broad, its length about twice in total length. Snout broad blunt. Mouth small, protractile ; teeth bands narrow ; oronasal groove present, cirri absent. Eyes small, their diameter about half of spiracle width. Five pairs of small ventral gill openings, the widest the nearest the mouth. Two spineless dorsal fins, their bases about equal length, and about equal to interdorsal space. Origin of first dorsal before ends of pelvic base. Caudal obliquely rounded without lobe. Skin smooth dusky brown with moderately large round black spots above, creamy white below. It grows to 445 mm in length (Misra, 1969).

Distribution : India, Saudi Arabia, Ethiopia, Vietnam, Indonesia, Singapore, Malaysia and Thailand.

Specimens seen : 1 Spec. disc-width 132 mm KUMF 0839 (Bay of Bengal, 1971) ; PMBC 2448 (Singapore, 1972, collected by SEAFDEC)

DISCUSSION

Most of the young fishes, with either soft ray fins or bony ray fins, always change their characteristics when they become mature. It appears that the disk become relatively wider as fish mature. Unfortunately, the comparison of the width to the length of disk of other species could not be examined because of the availability of a few specimens. Another characteristic of *Temera hardwickii* which is interesting is the shape of male and female pelvic fins. Male pelvics with claspers, can be distinguished from female ones by their hind margins which is much more concave while the hind margins of females are truncate or more or less convex. This characteristic can be seen from other species such as *Narcine brunnea, N. timlei* etc.

Four species are found in Thailand and rarely recorded from other areas in the Indo-Pacific region, they are *Temera hardwickii, Narcine brunnea, N. prodorsalis* and *N. indica,* (Table 1).

The two recently recorded species of electric rays of Thailand are *Narcine prodorsalis* and *N. maculata,* there are some problems in identification, both of them are close to *N. timlei* which is common in the Indo-Pacific region.

The examined specimen of *Narcine prodorsalis* was slightly differed from the described specimen (Bessednov, 1966), in the situation of first dorsal fin, it might be because of different size or shrinkage preserved specimen. The author found that the origin of first dorsal about opposite to ends of base of pelvics in the specimen of 344 mm total length while the described specimen of 298 mm total length having the origin of first dorsal fin begins before the end of base of pelvics at the distance equal to the diameter of eye.

Bessednov (1966) commented that *Narcine prodorsalis* can be placed between N. *maculata* and *N. timlei.* It differs from *N. maculata* in the situation of its first dorsal fin and by its color. Its dark spots are bigger than *N. maculata's* small spots and smaller than *N. maculata's* big spots. Then compared with *N. timlei,* the first dorsal fin of *N. prodorsalis* is even closer to the head, and the color is also different ; it's spots are much smaller and more numerous than those of *N. timlei.*

The measurement presents some difficulty of study because of shrinkage of the preserved specimens and another source of probable error is the small number of specimens available for examination.

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Table 1 Species of Electric-rays occurred in Indo-Pacific regions (From different sources)

Japan **(1) Lindberg & Legeza** **(1967)**	**Philippines** **(2) Herre (1953)**	**Tonkin gulf** **(S. China sea)** **(3) Bessednov (1966)**
Narke dipterygia (Bl. & Schn.) *Narcine japonica* (Schl.) *N. lingula* Rich.	*Torpedo marmorata* Risso. *Narcine timlei* (Bl. & Schn.)	*Narcine prodorsalis* Bessednov *N. maculata* (Shaw) *N. timlei* (Bl. & Schn.) *N. brevilabiata* Bessednov
Thailand **(4) Monkolprasit (1984)**	**Malaysia** **(5) Scott (1959)**	**India** **(6) Misra (1969)**
Temera hardwickii Gray *Narke dipterygia* (Bl. & Schn.) *Narcine indica* Henle *N. timlei* (Bl. & Schn.) *N. maculata* (Shaw) *N. brunnea* Annandale *N. prodorsalis* Bess.	*Narke dipterygia* (Bl. & Schn.) *Narcine timlei* (Bl. & Schn.)	*Bengalichthys impennis* Annandale *Benthobatis moresbyi* Alc. *Narke dipterygia* (Bl. & Schn.) *N. maculata* (Shaw) *N. timlei* (Bl. & Schn.) *Torpedo panthera* Olfers *T. sinus-persici* Olfers
Sri Lanka **(7) Munro (1955)**	**South Africa** **(8) Smith (1965)**	**Red Sea and S. Arabia** **(9) Fowler (1956)**
Narke dipterygia (Bl. & Schn.) *Narcine brunnea* Annandale *N. timlei (Bl. & Schn.)*	*Narke capensis* (Gmelin) *Heteronarce garmani* Regan *Torpedo marmorata* Risso. *T. nobiliana* Bonap.	*Narcine maculata* (Shaw) *Heteronarce mollis* (Lloyd) *Torpedo marmorata* Risso *T. sinus-persici* Olfers

PLATE A.

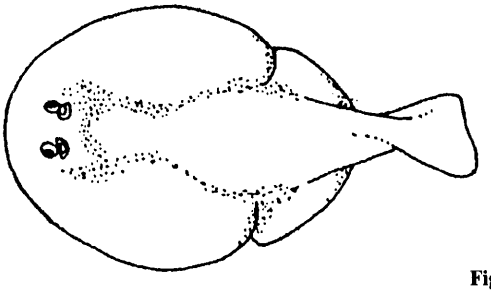

Figure 1

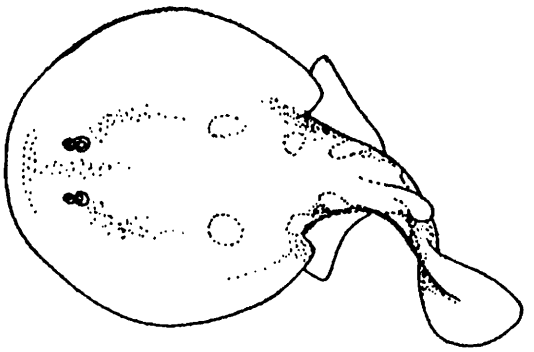

Figure 2

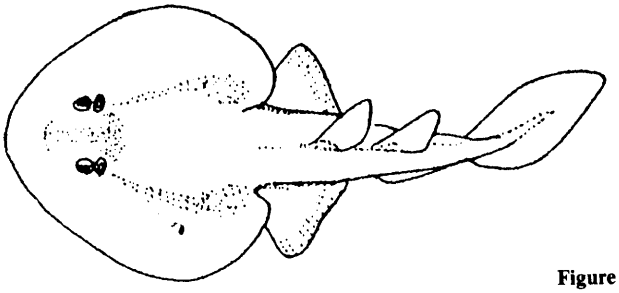

Figure 3

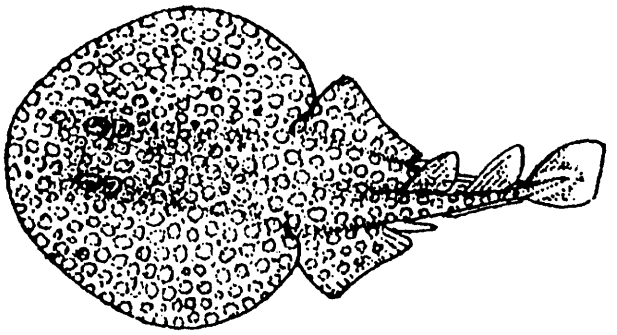

Figure 4

PLATE B.

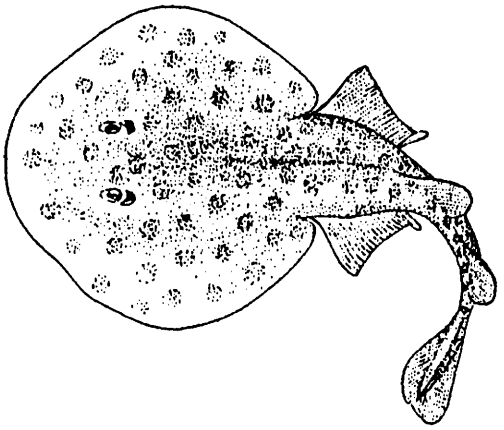

Figure 5

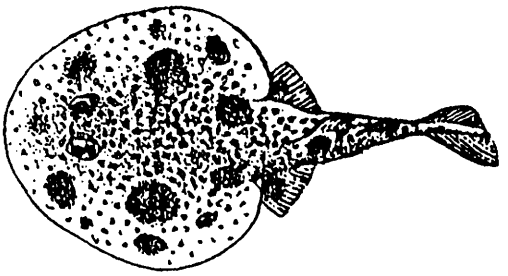

Figure 6

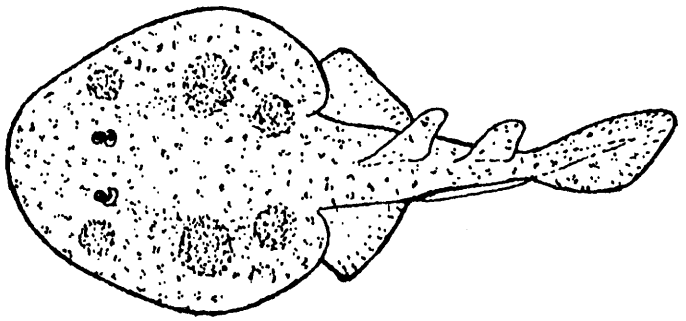

Figure 7

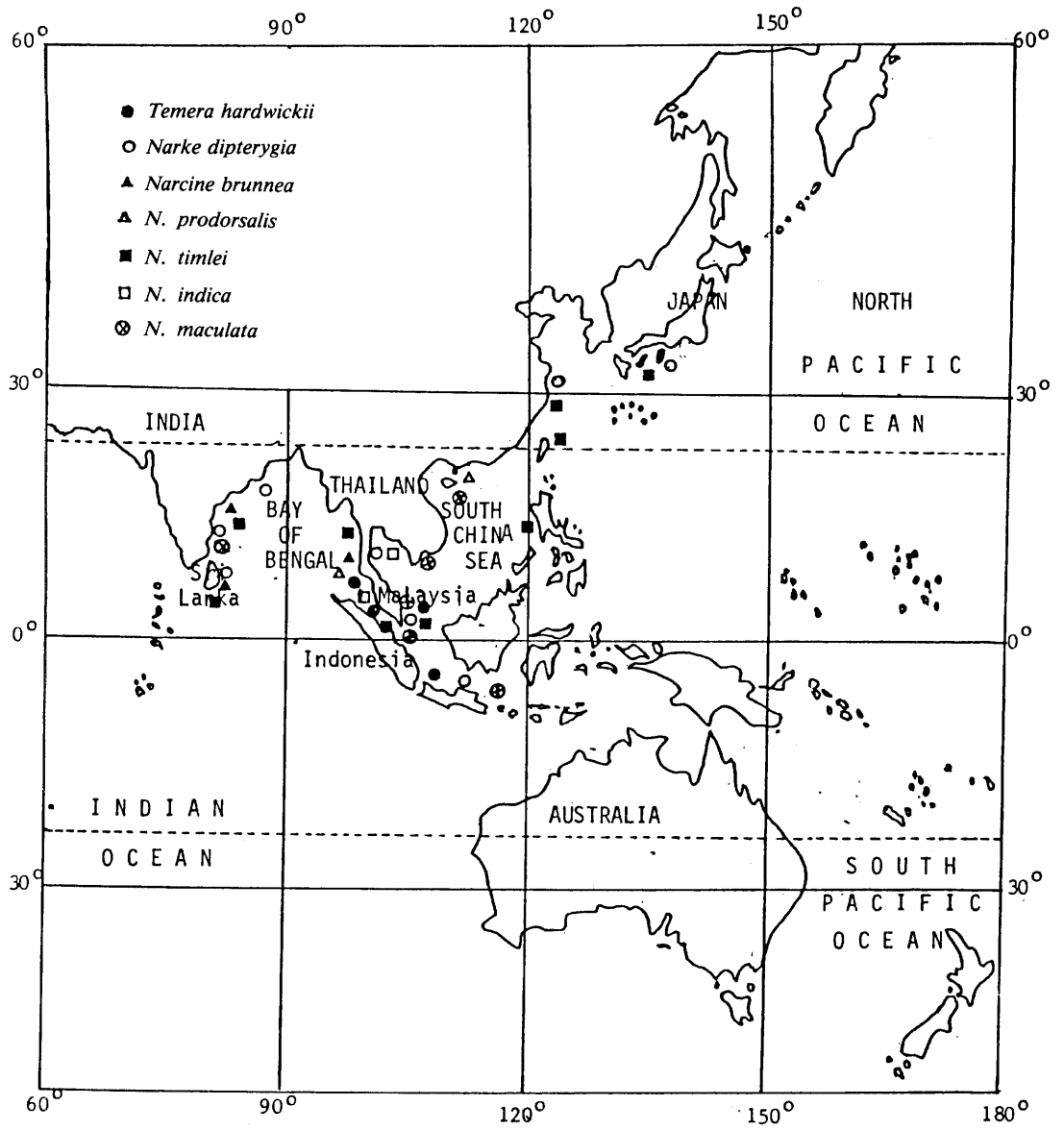

Figure 1 Distribution of seven species of electric rays (Family Torpedinidae) of Indo-Pacific region.