



RP1970/210

Field work for a study of  
the amphibians and

ZOOLOGY, OFFICE OF THE PRIME MINISTER  
AL OFFICE, OFFICE OF THE PRIME MINISTER

ROYAL FOREST DEPARTMENT, MINISTRY OF AGRICULTURE

DEPARTMENT OF RICE, MINISTRY OF AGRICULTURE

DEPARTMENT OF LAND DEVELOPMENT, MINISTRY OF NATIONAL DEVELOPMENT

DEPARTMENT OF MINERAL RESOURCES, MINISTRY OF NATIONAL DEVELOPMENT

CHULALONGKORN UNIVERSITY

KASETSART UNIVERSITY

MILITARY RESEARCH AND DEVELOPMENT CENTER, MINISTRY OF DEFENCE

SEATO MEDICAL RESEARCH LABORATORY

APPLIED SCIENTIFIC RESEARCH CORPORATION OF THAILAND

COOPERATIVE RESEARCH PROGRAMME NO. 27

TROPICAL ENVIRONMENTAL DATA ( TREND )

ECOSYSTEM STUDY OF TROPICAL DRY-EVERGREEN FOREST

RESEARCH PROJECT NO. 27/1

DESCRIPTION OF TROPICAL DRY-EVERGREEN FOREST ECOSYSTEM

REPORT NO. 12

FIELD WORK FOR A STUDY OF THE AMPHIBIANS AND REPTILES OF THE  
ASRCT SAKAERAT EXPERIMENT STATION, AMPHOE PAK THONG CHAI  
CHANGWAT NAKHON RATCHASIMA

BY

W. RONALD HEYER

ASRCT, BANGKOK 1970

not for publication

DEPARTMENT OF METEOROLOGY, OFFICE OF THE PRIME MINISTER  
NATIONAL STATISTICAL OFFICE, OFFICE OF THE PRIME MINISTER  
ROYAL FOREST DEPARTMENT, MINISTRY OF AGRICULTURE  
DEPARTMENT OF RICE, MINISTRY OF AGRICULTURE  
DEPARTMENT OF LAND DEVELOPMENT, MINISTRY OF NATIONAL DEVELOPMENT  
DEPARTMENT OF MINERAL RESOURCES, MINISTRY OF NATIONAL DEVELOPMENT  
CHULALONGKORN UNIVERSITY  
KASETSART UNIVERSITY  
MILITARY RESEARCH AND DEVELOPMENT CENTER, MINISTRY OF DEFENCE  
SEATO MEDICAL RESEARCH LABORATORY  
APPLIED SCIENTIFIC RESEARCH CORPORATION OF THAILAND

COOPERATIVE RESEARCH PROGRAMME NO. 27  
TROPICAL ENVIRONMENTAL DATA ( TREND )  
ECOSYSTEM STUDY OF TROPICAL DRY-EVERGREEN FOREST  
RESEARCH PROJECT NO. 27/1  
DESCRIPTION OF TROPICAL DRY-EVERGREEN FOREST ECOSYSTEM

REPORT NO. 12  
FIELD WORK FOR A STUDY OF THE AMPHIBIANS AND REPTILES OF THE  
ASRCT SAKAERAT EXPERIMENT STATION, AMPHOE PAK THONG CHAI  
CHANGWAT NAKHON RATCHASIMA

BY  
W. RONALD HEYER

ASRCT, BANGKOK 1970

not for publication

## CONTENTS

	Page
FOREWORD	1
(Report)	2
APPENDIX I - List of amphibians and reptiles taken at Sakaerat Experiment Station, 1969	5
APPENDIX II - An artificial key to the adult Amphibia of Sakaerat	10
APPENDIX III - An artificial key to the adult Reptilia of Sakaerat	14

## F O R E W O R D

The present report results from the field work undertaken at the ASRCT Sakaerat Experiment Station with the financial support of a National Science Foundation (U.S.A.) grant awarded to Dr. Robert F. Inger of the Field Museum of Natural History (Chicago). It has been included under the present project reports because of its contribution to the description of the forest ecosystem under study at that site.

FIELD WORK FOR A STUDY OF THE AMPHIBIANS AND  
REPTILES OF THE ASRCT SAKAERAT EXPERIMENT STATION,  
AMPHOE PAK THONG CHAI, CHANGWAT NAKHON RATCHASIMA

By W. Ronald Heyer\*

This report summarizes the field work undertaken by a party from the Field Museum of Natural History (Chicago) with the financial support of a National Science Foundation (U.S.A.) grant awarded to Dr. Robert F. Inger. The field work was begun 23 February 1969 and completed 8 January 1970.

The principal personnel concerned with the field work were: Dr. Robert F. Inger, who was present for the initial 3 months of the investigation and returned for a few days at the close of the project; Dr. W. Ronald Heyer and Mr. Sukhum Pongsapipatana (ASRCT) who were present throughout the project; and 5 labourers hired locally. In addition, Mrs. Miriam Heyer put in many volunteer hours aiding in the preservation, sorting, packing of specimens, and aiding in secretarial work.

Over 5400 individual specimens of 103 different species of amphibians and reptiles were collected by 3 major sampling techniques. In each case, a body of ecological data was recorded for each specimen with respect to date, time, and exact place of capture. All specimens have been shipped to the Field Museum where Dr. Inger is identifying, measuring, and taking the stomach contents of each individual. A sample of each species collected will be returned to ASRCT.

Almost 500 8 by 8 m quadrats were sampled from the forest floor of the dry-evergreen forest; over 700 quadrats were sampled from the deciduous dipterocarp forest floor. Seven surveyed stream portions (3 on the Sakaerat Experiment Station, 2 south of the Station along the highway, 1 at Sarika waterfall, 1 at Khao Yai) were sampled at nights once each month. The rest of the specimens were captured during cruising collecting periods either at night or in the day.

Dr. Inger is in the process of analyzing the body of data collected with respect to diversity patterns, comparative niche sizes, degree of

---

\* Pacific Lutheran University, Tacoma, Washington, U.S.A.

niche overlap, and habitat utilization. The author will analyze another body of data collected on larval frog populations with respect to seasonal species, succession patterns, and population dynamics. Mr. Sukhum Pongsapipatana is in the process of reporting on a collection of reptile eggs made at the site.

The specimens and data are in various stages of analysis; most ecological statements would be premature at this point. The data on broad occurrences of species within major vegetation types is readily available from the catalogue sheets, however, and is worthy of comment at this time.

A list of the species collected is attached (see Appendix I). The list includes only those species the party collected on the Station itself. Three species are included that were not collected this year: Ichthyophis glutinosus and Python reticulatus are included on the basis of collections made by Mr. Karl Frogner at the site; Varanus bengalensis has been observed several times but never captured. Three vegetation types are distinguished: the dry-evergreen forest (DE); the deciduous dipterocarp forest (DDP); and open agricultural land (AG). At Station, agricultural land is limited to the immediate area adjacent to the highway. For each species, the occurrence within vegetation types is indicated by DE, DDP, or AG. If the species is common in a vegetation type, the occurrence is indicated by capital letters; lower case indicates rarity. Criteria for deciding whether a species occurs commonly or rarely within a vegetation type is based on my observations and bias.

For further analysis, the data from collections made in other agricultural areas adjacent to Sakaerat have been added. The results are: the dry-evergreen forest has a herpetofauna of 74 species, the deciduous dipterocarp 58 species, and agricultural areas 46 species. The dry-evergreen and deciduous dipterocarp forests share 33 species in common, the deciduous dipterocarp and agricultural areas share 38 species, and the dry-evergreen and agricultural areas share 26 species. Another way of looking at the data is to use the coefficient of difference,

$$CD = 1 - \frac{\text{number of species in common}}{\text{number of species in the larger sample being compared}} \times 100\%.$$

Any figure over 50 per cent is considered significant; that is, the herpetofaunal assemblages being compared are considered distinct. The CD values are: DE-DDP = 55%, DDP-AG = 34%, DE-AG = 65%. Thus the dry-evergreen and deciduous dipterocarp forests support distinct herpetofaunal assemblages, while the deciduous dipterocarp and agricultural areas share a common herpetofauna.

There is doubt as to the successional stage of the deciduous dipterocarp forest. It unquestionably is a fire climax forest at present. At the study site, the deciduous dipterocarp probably represents a successional stage leading to the dry-evergreen forest, if fires were curtailed for upwards of 100 years (pers. comm. C.F. van Beusekom, view shared by the author.). Others maintain that the deciduous dipterocarp is a natural fire climax forest; the fires not being caused principally by man. The interesting point with respect to the amphibian and reptile data is that the assemblages are distinct in the two forest types. Thus there is a substantial historical difference between the forest communities; the deciduous dipterocarp herpetofauna is not merely a reduced dry-evergreen herpetofauna. Apparently, man has made his presence felt in north-eastern Thailand for many hundreds of years. The recent nature of the agricultural clearings in the Sakaerat region is reflected by the fact that the herpetofauna of the agricultural areas is basically a reduced deciduous dipterocarp herpetofauna.

APPENDIX I

LIST OF AMPHIBIANS AND REPTILES  
TAKEN AT SAKAERAT EXPERIMENT STATION, 1969

FROGS

BUFONIDAE

DE DDP AG 1. Bufo melanostictus

MICROHYLIDAE

de ddp AG 2. Calluella guttulata

DDP AG 3. Glyphoglossus molossus

de 4. Microhyla berdmorei

DE DDP AG 5. M. butleri

DE DDP AG 6. M. heymonsi

DE ddp 7. M. inornata

DE DDP AG 8. M. ornata

de DDP AG 9. M. pulchra

DE DDP AG 10. Kaloula pulchra

DDP AG 11. K. mediolineata

RANIDAE

DE DDP AG 12. Ooeidozyga laevis

AG 13. O. lima

AG 14. Rana erythraea

DDP 15. R. lateralis

de DDP AG 16. R. limnocharis

DE 17. R. nigrovittata

DE 18. R. pileata

DDP AG 19. R. tigrina

RHACOPHORIDAE

DE ddp AG 20. Chirixalus nongkhorensis

DE ddp AG 21. C. vittatus

DE DDP AG 22. Polypedates leucomystax

DE 23. Rhacophorus bimaculatus

DE 24. Theلودerma stellatum



CAECILIANS

CAECILIIDAE

- ag 25. Ichthyophis glutinosus

TURTLES

EMYDIDAE

- DE 26. Cyclemys dentata

TESTUDINIDAE

- de ddp 27. Testudo elongata

LIZARDS

AGAMIDAE

- DE 28. Acanthosaura armata

- DE 29. Calotes emma

- DDP AG 30. C. mystaceus

- de DDP AG 31. C. versicolor

- DE 32. Draco maculatus

- DE 33. D. taeniopterus

- DDP 34. Leiolepis belliana

- DE 35. Physignathus cocincinus

GEKKONIDAE

- DE 36. Cyrtodactylus angularis

- DE 37. C. intermedius

- de DDP AG 38. Gekko gecko

- de 39. Hemidactylus garnotii

- DE 40. Hemiphyllodactylus yunnanensis

- DDP AG 41. Peropus laceratus

- DE 42. P. mutilatus

- DDP AG 43. Phyllodactylus siamensis

- DDP AG 44. Platyurus platyurus

- DE 45. Ptychozoon lionatum

LACERTIDAE

ddp 46. Takydromus sexlineatus

SCINCIDAE

de 47. Dasia olivacea  
 DE 48. Leiolopisma reevesi  
 DE 49. L. siamensis  
 de 50. L. vittigerum  
 de DDP 51. Mabuya longicaudata  
 DE DDP AG 52. M. macularia  
 DE DDP AG 53. M. multifasciata  
 DE 54. Ophioscincus sp.  
 DE DDP AG 55. Riopa bowringi  
 de 56. Sphenomorphus indicus  
 DE 57. S. maculatus

VARANIDAE

ddp 58. Varanus bengalensis

SNAKES

BOIDAE

ddp ag 59. Python reticulatus

COLUBRIDAE

DDP AG 60. Ahaetulla subocularis  
 DE DDP ag 61. Boiga cyanea  
 DDP 62. B. cynodon  
 DDP 63. B. multomaculata  
 de 64. Calamaria pavementata  
 DE DDP AG 65. Chrysopelea ornata  
 DE ddp 66. Dryocalamus davisonii  
 ddp 67. Dryophis nasutus  
 DE DDP AG 68. D. prasinus  
 ddp AG 69. Elaphe radiata  
 AG 70. Enhydris plumbea  
 ddp ag 71. Gonyosoma oxycephalum

DE			72.	<u>Liopeltis scriptus</u>
	DDP	AG	73.	<u>Lycodon capucinus</u>
de			74.	<u>L. fasciatus</u>
de	ddp		75.	<u>Lycodon laoensis</u>
de			76.	<u>L. subcinctus</u>
	ddp		77.	<u>Natrix chrysargus</u>
DE	DDP		78.	<u>N. nigrocinctus</u>
DE	DDP	AG	79.	<u>N. piscator</u>
DE	DDP	AG	80.	<u>N. subminiata</u>
	ddp		81.	<u>N. stolatus</u>
DE	DDP	AG	82.	<u>Oligodon cinereus</u>
DE	DDP	ag	83.	<u>O. cyclurus</u>
DE	DDP		84.	<u>O. inornatus</u>
DE	DDP	AG	85.	<u>O. quadrilineatus</u>
	ddp		86.	<u>Pareas carinatus</u>
DE			87.	<u>P. margaritophorus</u>
DE			88.	<u>Psammodynastes pulverulentus</u>
	ddp	AG	89.	<u>Ptyas korros</u>
DE			90.	<u>Sibynophis triangularis</u>

ELAPIDAE

de			91.	<u>Bungarus candidus</u>
de			92.	<u>B. fasciatus</u>
de	ddp		93.	<u>Calliophis maculiceps</u>
de	ddp		94.	<u>Naja naja</u>
de			95.	<u>Ophiophagus hannah</u>

TYPHLOPIDAE

de			96.	<u>Typhlops albiceps</u>
	DDP		97.	<u>T. braminus</u>
de			98.	<u>T. diardi</u>
de			99.	<u>T. sp.</u>

VIPERIDAE

- DDP 100. Agkistrodon rhodostoma  
DE 101. Trimeresurus albolabris  
DE 102. T. popeorum

XENOPELTIDAE

- de 103. Xenopeltis unicolor

Note: Letters designate occurrence in vegetation types as follows:

- DE - dry-evergreen forest,  
DDP - deciduous dipterocarp forest,  
AG - open agricultural land.

Capital letters indicate that the species is common in the vegetation type; lower case indicates rarity.

APPENDIX II

AN ARTIFICIAL KEY TO THE ADULT AMPHIBIA OF SAKAERAT

1A.	Limbless . . . . .	<u>Ichthyophis glutinosus</u>
1B.	Limbs present . . . . .	2
2A.	Maxillary teeth absent (Figure 1 B) . . . . .	3
2B.	Maxillary teeth present (Figure 1 A) . . . . .	12
3A.	Cranial crests present . . . . .	<u>Bufo melanostictus</u>
3B.	Cranial crests absent . . . . .	4
4A.	Finger tips distinctly truncate . . . . .	<u>Kaloula pulchra</u>
4B.	Finger tips pointed or slightly truncate . . . . .	5
5A.	Inner metatarsal tubercle shovel-shaped (Figure 2 B, C) . . . . .	6
5B.	Inner metatarsal tubercle normal (Figure 2 A) . . . . .	7
6A.	Inner metatarsal tubercle twice the size of the outer, almost in contact (Figure 2 C) . . . . .	<u>Kaloula mediolineata</u>
6B.	Inner metatarsal tubercle three times the size of the outer, separated by the length of outer tubercle (Figure 2 B) . . . . .	<u>Glyphoglossus molossus</u>
7A.	Toes with vestigial web (Figure 2 A, C) . . . . .	8
7B.	Toes noticeably webbed (Figure 2 B) . . . . .	10
8A.	No lateral stripe . . . . .	<u>Microhyla inornata</u>
8B.	Dark lateral stripe from eye to at least mid-body . . . . .	9
9A.	Upper toe surface grooved (Figure 3 C) . . . . .	<u>Microhyla ornata</u>
9B.	Upper toe surface not grooved (Figure 3 A, B) . . . . .	<u>Microhyla heymonsi</u>
10A.	Upper toe surface not grooved (Figure 3 A, B) . . . . .	<u>Microhyla butleri</u>
10B.	Upper toe surface grooved (Figure 3 C) . . . . .	11

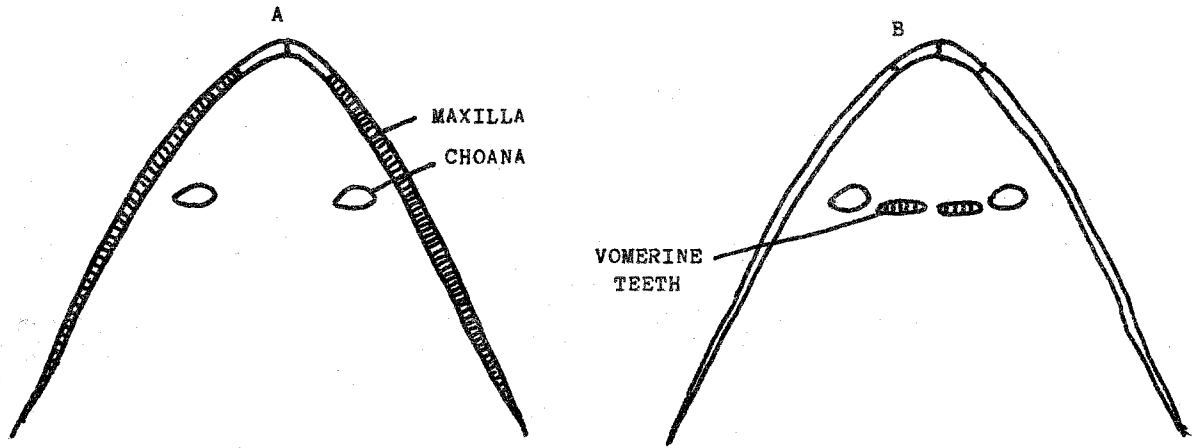


Figure 1. Roof of mouth.

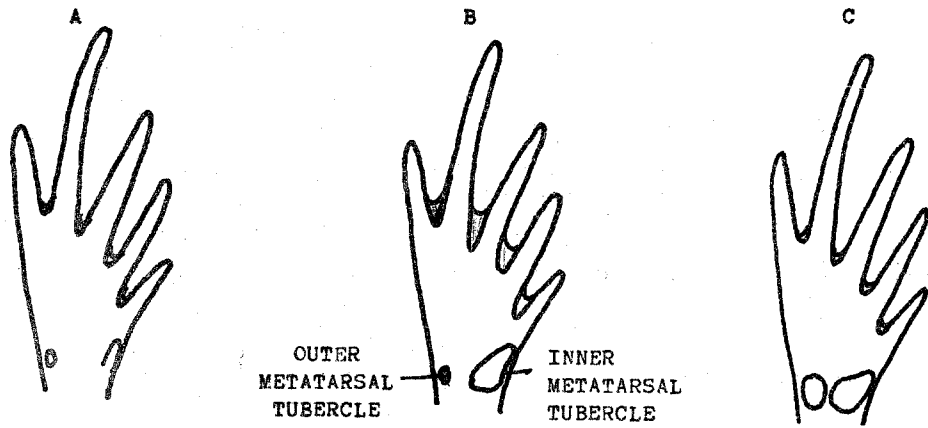


Figure 2. Sole of right foot.

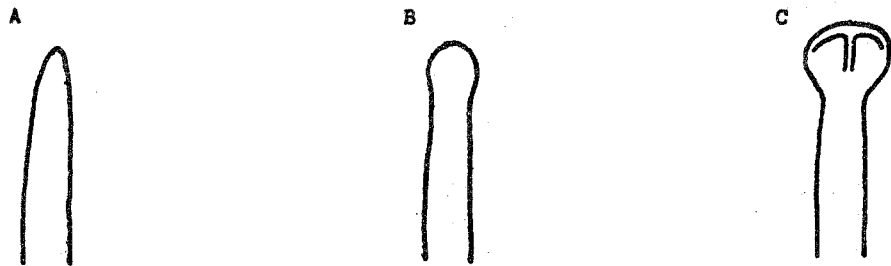


Figure 3. Upper surface of toe tip.

- 11A. Toes webbed almost to disks . . . . . Microhyla berdmorei
- 11B. Toes one third to one half webbed . . . . . Microhyla pulchra
- 12A. Two dermal ridges across palate . . . . . Calluella guttulata
- 12B. Palate lacking dermal ridges. . . . . 13
- 13A. Vomerine teeth present (Figure 1 B) . . . . . 14
- 13B. Vomerine teeth absent (Figure 1 A). . . . . 21
- 14A. 1 pair of light dorsolateral stripes Rana erythraea
- 14B. No light dorsolateral stripes (may be dark, or mid-dorsal light stripe may be present). . . . . 15
- 15A. Large, distinct finger disks present. . . . . 16
- 15B. Finger tips pointed, swollen, or with small disks, never with large, distinct disks . . . . . 17
- 16A. Fingers more than  $\frac{1}{2}$  webbed. . . . . Rhacophorus bimaculatus
- 16B. Fingers less than  $\frac{1}{2}$  webbed. . . . . Polypedates leucomystax
- 17A. A pair of continuous, dark, dorsolateral folds. . . . . 18
- 17B. If dorsolateral folds present, they are short, never continuous from eye to groin. . . . . 19
- 18A. Sides below dorsolateral folds blackish; toe tips with small disks . . . . . Rana nigrovittata
- 18B. Sides below dorsolateral folds brown with some black spots; toe tips pointed Rana pileata
- 19A. Toe tips widened into small, but distinct disks . . . . . Rana pileata
- 19B. Toe tips pointed or swollen, never with small disks (Figure 3 A, B) . . . . . 20
- 20A. Outer metatarsal tubercle distinct. Rana limnocharis
- 20B. Outer metatarsal tubercle absent. . . . . Rana tigrina
- 21A. Tympanum distinct . . . . . 22
- 21B. Tympanum hidden . . . . . 24

- 22A. Dorsum rugose, tuberculate. . . . . Theloderma stellatum
- 22B. Dorsum smooth . . . . . 23
- 23A. A pair of light dorsolateral stripes. . . Chirixalus vittatus
- 23B. Dorsum blotched or uniform, without light  
dorsolateral lines. . . . . Chirixalus nongkhorensis
- 24A. Posterior surface of thigh with distinct  
light and dark longitudinal stripes Oeidozyga lima
- 24B. Posterior surface of thigh marbled Oeidozyga laevis



APPENDIX III

AN ARTIFICIAL KEY TO THE ADULT REPTILIA OF SAKAERAT

- 1A. Body covered with a shell. . . . . 2
- 1B. Body not covered with a shell. . . . . 3
  - 2A. Feet paddle-like, toes webbed; aquatic Cyclemys dentata
  - 2B. Feet elephant-like; terrestrial . . . Testudo elongata
- 3A. Limbs present. . . . . 4
- 3B. Limbs absent . . . . . 32
  - 4A. Sides of body with a flap of skin . . . . . 5
  - 4B. No flap of skin on sides of body. . . . . 8
- 5A. Lateral body flap supported by ribs; digits not widened. . . . . 6
- 5B. Lateral body flap not rib supported; digits with  
widened adhesive lamellae (Figure 4) . . . . . 7
  - 6A. Tympanum covered with scales; undersurface  
of wing spotted or uniform. . . . . Draco maculatus
  - 6B. Tympanum naked; undersurface of wing with  
dark, wide transverse bars. . . . . Draco taeniopterus
- 7A. Winglike expansion on side of head;  
subdigital lamellae single . . . . . Ptychozoon lionatum
- 7B. No winglike expansion on side of head;  
subdigital lamellae divided. . . . . Platyurus platyurus
- 8A. Head and body with mid-dorsal row of spines . . . . . 9
- 8B. Mid-dorsal scales may be enlarged, but never spiny. . . . . 13
- 9A. Scales adjacent to dorsal crest small, granular. . . . . 10
- 9B. Scales adjacent to dorsal crest larger (not  
larger than other lateral scales, however) . . . . . 11
  - 10A. Lateral body scales homogeneous . . . Physignathus cocincinus
  - 10B. Lateral body scales heterogeneous . . Acanthosaura armata

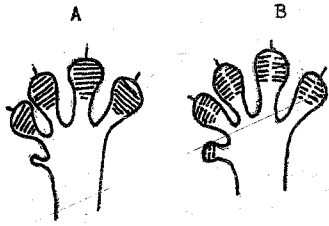


Figure 4. Ventral view of left hand.

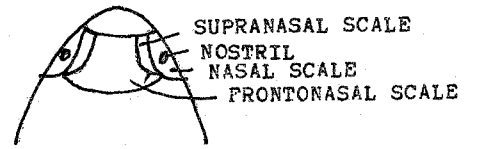


Figure 5. Dorsal view of tip of snout.

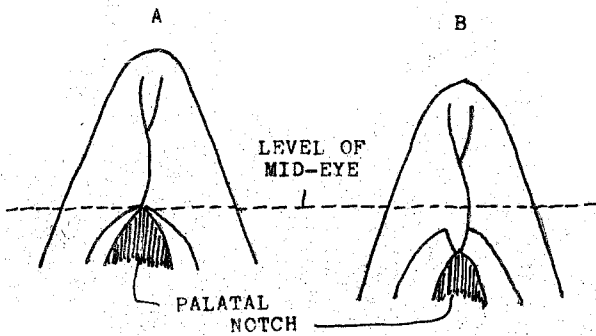


Figure 6. Ventral view of roof of mouth.

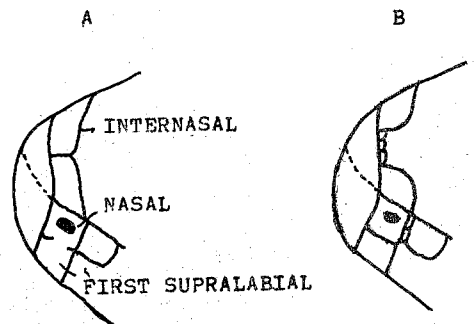


Figure 7. Dorsolateral view of tip of snout.

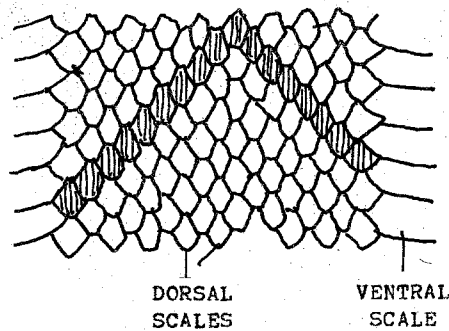


Figure 8. Method for counting scale rows at midbody (17).

11A.	No fold or pit with small scales in front of shoulder. . . . .	<u>Calotes versicolor</u>	
11B.	A fold or pit with small scales in front of shoulder. . . . .		12
12A.	Postorbital spine present. . . . .	<u>Calotes emma</u>	
12B.	Postorbital spine absent . . . . .	<u>Calotes mystaceus</u>	
13A.	Widened subdigital lamellae present (Figure 4) . . . . .		14
13B.	No widened subdigital lamellae . . . . .		19
14A.	One pair of widened terminal lamellae, between which the claw is retractile	<u>Phyllodactylus siamensis</u>	
14B.	More than one pair of widened lamellae (Figure 4). . . . .		15
15A.	All subdigital lamellae single (Figure 4 A) . . . . .	<u>Gekko gekko</u>	
15B.	At least distal subdigital lamellae divided (Figure 4 B) . . . . .		16
16A.	Inner digit vestigial, no claw (Figure 4 A) . . . . .	<u>Hemiphyllodactylus yunnanensis</u>	
16B.	Inner digit well developed, claw present or absent (Figure 4 B) . . . . .		17
17A.	Claw present on inner digit. . . . .	<u>Hemidactylus garnotii</u>	
17B.	No claw on inner digit . . . . .		18
18A.	Subcaudal scales not transversely widened; no web on foot. . . . .	<u>Peropus laceratus</u>	
18B.	Subcaudal scales transversely widened; noticeable web on foot. . . . .	<u>Peropus mutilatus</u>	
19A.	Scales covering top of head small, granular. . . . .		20
19B.	Scales covering top of head large symmetrical plates . . . . .		23

- 20A. Tongue long, slender, deeply bifid,  
retractile into a sheath . . . . . Varanus bengalensis
- 20B. Tongue not deeply bifid or  
retractile into a sheath . . . . . 21
- 21A. Eyelids present; pupil rounded . . . . . Leiolepis belliana
- 21B. No eyelids; pupil a vertical slit. . . . . 22
- 22A. Dorsum spotted; subcaudal scales  
not widened. . . . . Cyrtodactylus angularis
- 22B. Dorsum banded; median continuous series  
of transversely widened subcaudal  
scales . . . . . Cyrtodactylus intermedius
- 23A. Tail three to four times snout-vent length;  
entire body covered with strongly keeled  
scales forming continuous ridges . . . . . Takydromus sexlineatus
- 23B. Tail never more than twice snout-vent  
length; if scales are keeled, never forming  
continuous ridges. . . . . 24
- 24A. Supranasal scales present (Figure 5) . . . . . 25
- 24B. Supranasal scales absent . . . . . 29
- 25A. Forelimb reaches less than half distance  
to groin . . . . . Riopa bowringi
- 25B. Forelimb reaches more than half distance  
to groin . . . . . 26
- 26A. Palatal notch not reaching level of eyes  
(Figure 6 B); greenish in life;  
arboreal . . . . . Dasia olivacea
- 26B. Palatal notch reaching forward to  
between eyes (Figure 6 A);  
never greenish; terrestrial. . . . . 27
- 27A. Two to three feeble keels on each  
dorsal scale . . . . . Mabuya longicaudata
- 27B. Three to nine strong keels per dorsal scale. . . . . 28

- 28A. Distinct dark lateral band, usually well defined with light lines on both margins; 5-7 strong keels per dorsal scale; moderate size, 60 mm snout-vent . . . . . Mabuya macularia
- 28B. Sides dark, but no lateral band set off by light margins on either side; 3-5 strong keels per dorsal scale; large size, 90 mm snout-vent . . . . . Mabuya multifasciata
- 29A. Lower eyelid scaled; forelimb reaches more than half distance to groin. . . . . 30
- 29B. Lower eyelid with a transparent disk; forelimb reaches less than half distance to groin . . . . . 31
- 30A. 38-42 scalerows at mid-body; smaller, to 62 mm snout-vent . . . . . Sphenomorphus maculatus
- 30B. 34-36 scalerows at mid-body; larger, to 97 mm snout-vent. . . . . Sphenomorphus indicus
- 31A. Body with continuous stripes of black and white (green or gold in life). . . . . Leiolopisma vittigerum
- 31B. Body lacking continuous black and white stripes. . . . . 32
- 32A. Dark dorsolateral line broken up into series of blotches; faintly red on sides in life . . . . . Leiolopisma reevesi
- 32B. Dark dorsolateral line continuous or absent; males bright red laterally and ventrally. . . . . Leiolopisma siamensis
- 33A. Ventral scales same size as dorsal scales. . . . . 34
- 33B. Ventral scales widened, at least 2-3 times as wide as dorsal scales . . . . . 38
- 34A. Eye exposed; tail long . . . . . Ophioscincus sp.
- 34B. Eye hidden under head shield; tail 2-5 mm long . . . . . 35

35A.	Whitish; large, over 300 mm. . . . .	<u>Typhlops diardi</u>	
35B.	Gray-black; smaller, less than 250 mm. . . . .		36
36A.	22 scalerows around body (Figure 8)	<u>Typhlops sp.</u>	
36B.	20 scalerows around body . . . . .		37
37A.	Tip of head and tail white . . . . .	<u>Typhlops albiceps</u>	
37B.	Entire snake uniform colour. . . . .	<u>Typhlops braminus</u>	
38A.	Deep pit on side of face between nostril and eye. . . . .		39
38B.	No facial pit. . . . .		42
39A.	More than 60 scalerows around body . . . .	<u>Python reticulatus</u>	
39B.	Less than 30 scalerows around body . . . . .		40
40A.	Nine symmetrical head shields. . . . .	<u>Agkistrodon rhodostoma</u>	
40B.	Upper part of head covered with small scales, sometimes the scale above eye large. . . . .		41
41A.	Internasals in contact; first supralabial not completely separated from nasal; no small scales behind the nasal (Figure 7 A)	<u>Trimeresurus albolabris</u>	
41B.	Internasals always separated by several small scales; first supralabial always separated from nasal by a suture; two small scales behind the nasal (Figure 7 B). . . . .	<u>Trimeresurus popeorum</u>	
42A.	13 scalerows at mid-body (Figure 8). . . . .		43
42B.	More than 13 scalerows at mid-body . . . . .		46
43A.	Head dark, body and tail green, venter reddish, tail with 2 dark rings. . . . .	<u>Calliophis maculiceps</u>	
43B.	Not so marked; tail never light with only 2 complete dark rings . . . . .		44

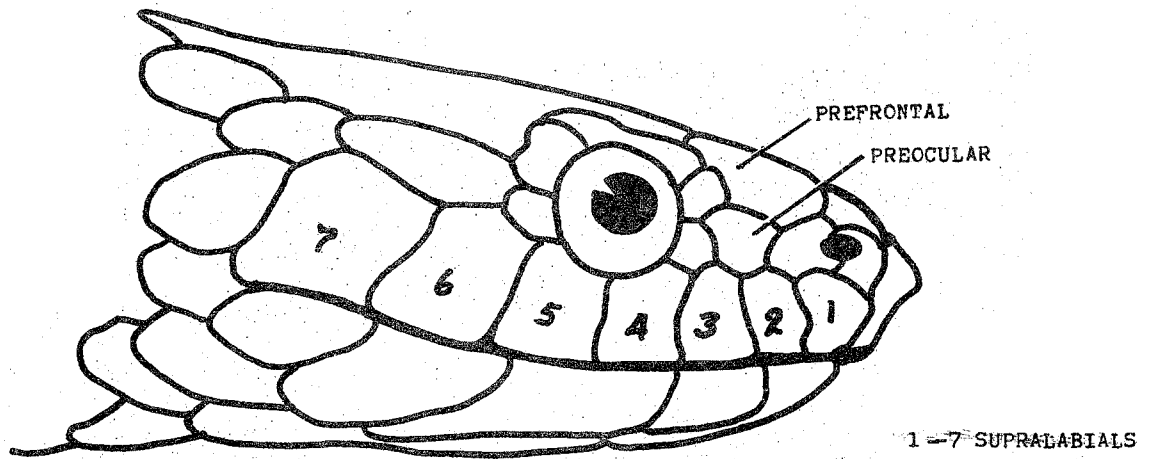


Figure 9. Lateral view of snake head.

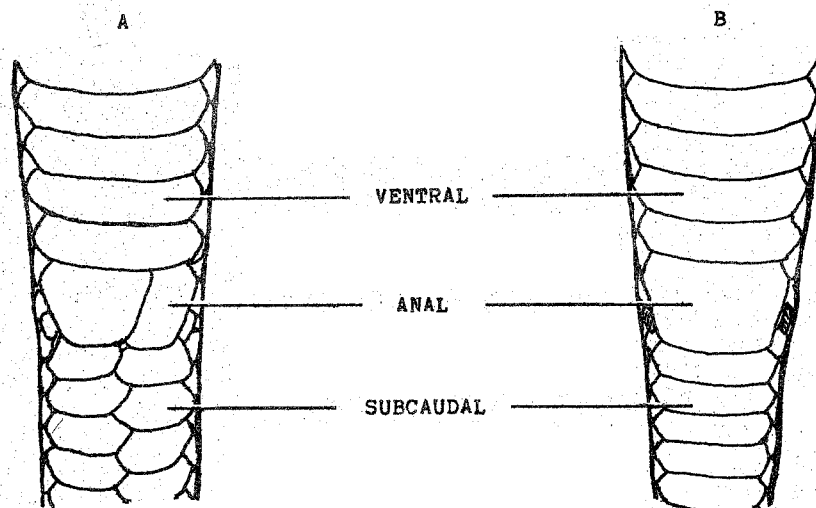


Figure 10. Ventral view of snake body at beginning of tail.

52A.	Anal single (Figure 10 B) . . . . .	53
52B.	Anal divided (Figure 10 A) . . . . .	55
53A.	Head and neck indistinct; eye with round pupil . . . . .	<u>Oligodon inornatus</u>
53B.	Head distinct from neck; vertical pupil . . . . .	54
54A.	Body not strongly compressed; light ring around neck, often incomplete . . . . .	<u>Pareas margaritophorus</u>
54B.	Body strongly compressed; no light ring on neck. . . . .	<u>Pareas carinatus</u>
55A.	Side of body with light stripe. . . . .	<u>Ahaetulla subocularis</u>
55B.	Dorsum and sides uniform. . . . .	56
56A.	Eye with vertically elliptical pupil; head and neck indistinct. . . . .	<u>Xenopeltis unicolor</u>
56B.	Pupil round; head distinct from neck	<u>Ptyas korros</u>
57A.	17 scalerows at mid-body. . . . .	58
57B.	More than 17 scalerows at mid-body. . . . .	65
58A.	Body with contrasting dark and light bands. . . . .	59
58B.	Body patterns various, never with contrasting dark and light bands. . . . .	61
59A.	No preocular; light bands white in life; adult specimens with light bands on anterior body only . . . . .	<u>Lycodon subcinctus</u>
59B.	A preocular (Figure 9) separating prefrontal from eye; light bands yellow or red in life . . . . .	60
60A.	8 supralabials; anal single (Figure 10 B) . . . . .	<u>Lycodon fasciatus</u>
60B.	9 supralabials; anal divided (Figure 10 A) . . . . .	<u>Lycodon laoensis</u>
61A.	Anal single (Figure 10 B) . . . . .	62
61B.	Anal divided (Figure 10 A) . . . . .	63



- 62A. Head distinct from neck. . . . . Psammodynastes pulverulentus
- 62B. Head and neck indistinct . . . . . Oligodon cinereus
- 63A. 10 supralabials; black triangular postoccipital spot light edged posteriorly . . . . . Sibynophis triangularis
- 63B. 9 supralabials; head and neck with light bands, spots, or stripes, no dark triangular spot . . . . . 64
- 64A. Each dorsal scale with a black median line; body greenish above. . . . . Chrysopelea ornata
- 64B. Dorsal scales without a black median line; body lavender or brown with light reticulum. . . . . Lycodon capucinus
- 65A. Anal single (Figure 10 B). . . . . 66
- 65B. Anal divided (Figure 10 A). . . . . 72
- 66A. No dark stripes from eye extending to lip or neck. . . . . 67
- 66B. One or two dark stripes from eye extending to lip or neck . . . . . 68
- 67A. Head distinct from neck; no hood . . . . . Boiga cyanea
- 67B. Head indistinct from neck; elongate nuchal ribs capable of expanding the anterior part of the neck into a hood. . . . . Naja naja
- 68A. Dark longitudinal stripes on anterior two thirds of body or along entire length. . . . . 69
- 68B. No dark stripes along length of body . . . . . 70
- 69A. Two dorsal and two lateral brown stripes along length of body; venter with checkerboard pattern, reddish wash in life. . . . . Oligodon quadrilineatus
- 69B. Dorsolateral dark stripes distinct on anterior two thirds of body; venter uniform . . . . . Elaphe radiata

- 70A. 23 scalerows at mid-body . . . . . Boiga cynodon
- 70B. 19 or 21 scalerows at mid-body . . . . . 71
- 71A. Dorsum with numerous dark spots . . . . . Boiga multomaculata
- 71B. Dorsum with transverse stripes and bars or  
pattern obscure, never spotted . . . . . Oligodon cyclurus
- 72A. 21 or more scalerows at mid-body . . . . . 73
- 72B. 19 scalerows at mid-body . . . . . 74
- 73A. Dorsum with darker and lighter longitudinal  
stripes; venter yellowish with 2 or 3 dark  
longitudinal stripes; aquatic . . . . . Enhydris enhydris
- 73B. Dorsum and venter green, tail red in life;  
terrestrial . . . . . Gonyosoma oxycephalum
- 74A. Nostrils valvular on upper surface of  
snout; olive to olive black above;  
venter yellow, yellow extending to 2  
or 3 outer scalerows on sides;  
aquatic . . . . . Enhydris plumbea
- 74B. Nostrils not capable of being closed,  
situated on side of snout but may be  
directed upwards; colour patterns various,  
not as above; semi-aquatic or terrestrial . . . . . 75
- 75A. Two light longitudinal stripes on back . . . . . Natrix (Rhabdophis)  
stolatus
- 75B. Dorsal pattern various, never with two light  
longitudinal stripes . . . . . 76
- 76A. Nostril directed upwards; posterior  
maxillary teeth gradually enlarged, not  
fanglike . . . . . Natrix piscator
- 76B. Nostril lateral; posterior two maxillary  
teeth enlarged into ungrooved fangs,  
directed posteriorly . . . . . 77

- 77A. No distinct dark stripes from posterior edge of eye to upper lip or neck; distinct white chevron on neck pointing posteriorly . . . Natrix (Rhabdophis) chrysargus
  
- 77B. One or two distinct dark stripes from posterior edge of eye to upper lip or neck; if a light chevron on neck, indistinct. . . . . 78
  
- 78A. One distinct dark stripe on upper lip below eye; neck blackish followed by red for a short distance; normally 8 supralabials, third, fourth, and fifth bordering eye. . . . . Natrix (Rhabdophis) subminiata
  
- 78B. Two distinct dark stripes on upper lip below eye; no red on neck; normally 9 supralabials, fourth, fifth, and sixth bordering eye. . . . . Natrix (Rhabdophis) trocinctus