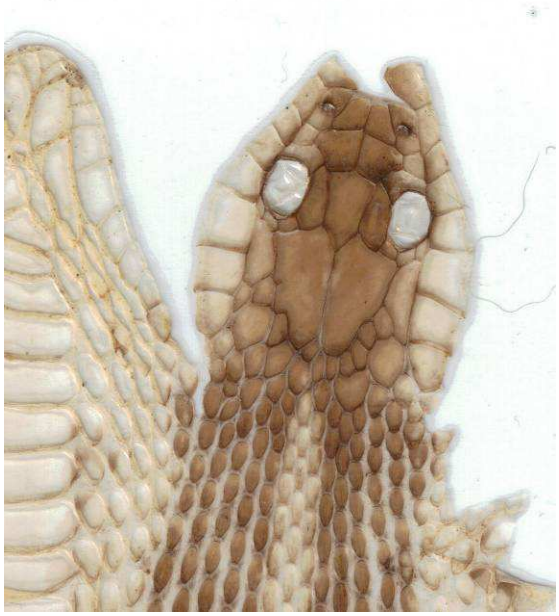
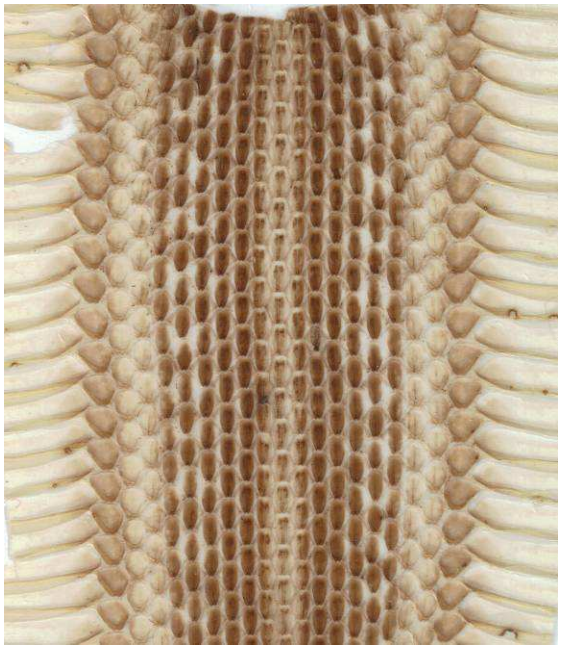
Guide to the Identification of the Shed Skins of the Snakes of Canada





Brian S. Gray

Guide to the Identification of the Shed Skins of the Snakes of Canada

By Brian S. Gray

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Front cover: Top image of a Common Garter Snake, *Thamnophis sirtalis*. Bottom left image of cephalic section of a Common Garter Snake shed skin. Bottom right image of mid-body section of a Common Garter Snake shed skin. All images by Brian S. Gray

Stuck with another lousy blind date, Karen hits her emergency dating eject button.

Used with permission of John McPherson.

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Introduction

One of the first processes to be completed by a newly hatched, or recently born snake, is ecdysis, or the shedding of its skin (Actually, only the outermost layer of the epidermis, the stratum corneum is shed.). Depending on the species, ecdysis can occur within hours (e.g. Eastern Hognose Snake, *Heterodon platirhinos*) to a week or more (e.g. Milk Snake, *Lampropeltis triangulum*) of birth or hatching. Subsequently, a snake may shed several times during a single active season. For example, Brown (1956) noted that Northern Water Snakes (*Nerodia sipedon*) from Ithaca, New York shed about four times per season. However, the frequency which snakes shed is quite variable and dependant on numerous factors. Some of these include the snake's age, growth rate, health, frequency of feeding, as well as the quality of food obtained. The amount of wear and tear and or the presence of injuries to the epidermis are other important factors. Once a shed skin is sloughed, it may remain in the environment for a week or two, and occasionally a month or more. During this window of opportunity, a shed may be found, preserved and identified.

When properly identified, a shed snake skin found in the field may yield much useful information. For instance, a shed may augment the results of atlases or monitoring programs by providing proof of a species presence (Figure 1), and may also serve as voucher material without sacrificing an actual snake. In the case of venomous snakes, such as Rattlesnakes, shed skins may provide evidence of a species without putting oneself in danger by having to get close to an actual snake. By studying the habitat and microhabitat a species' shed skins are found, researchers may better understand habitat preferences by snakes during ecdysis.

Figure 1. Top: A debris pile in old field habitat. Bottom: Brown Snake, *Storeria dekayi* shed skin found beneath shingles.

Twenty-six species of snake reach the northernmost limits of their ranges in Canada. Of these, the Common Garter Snake, *Thamnophis sirtalis* is found further north than any other North American snake (Ernst and Ernst 2003). An additional species, the Timber Rattlesnake, *Crotalus horridus* is believed to have been extirpated from Canada (Logier 1958; Gregory 2007); the last report being from Niagara Gorge, Ontario, in 1941 (Seburn and

Brooks 2007). Of the twenty-six extant species, sixteen (61.5%) are listed as endangered, threatened, or of special concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (Seburn and Brooks 2007). Included are two species, the Gopher Snake, *Pituophis catenifer* and Northern Water Snake, *Nerodia sipedon*, each of which have a listed subspecies, *P. c. deserticola* and *N. s. insularum*, respectively.

The purpose of this guide is to provide the user with a comprehensive reference to identify the shed skins of the 26 extant species of snake found in Canada. Although my previous work (Gray 2005) could be used by those in Ontario, Quebec, New Brunswick, and Nova Scotia, it contains numerous extralimital species which complicates and protracts the identification process. Furthermore, it is of limited use to individuals in the western Canadian provinces. The current guide is the first to focus on identifying the shed skins of the snakes of Canada.

Ecdysis: a brief review

Snakes, like other vertebrates shed the outermost layer of the epidermis known as the stratum corneum. Snakes, along with some lizards (e.g. *Elgaria* spp. and *Gerrhonotus* sp.) are notable in that they may shed their skins in a single piece (Figure 2). The stratum corneum consists of dead keratinized cell layers that along with the underlying layers of epidermis help to protect the snake from abrasion, retain moisture, and act as a barrier to some parasites and pathogens. However, because it is in constant contact with the environment, and thus sustains considerable wear and tear, and since it doesn't accommodate the growth of underlying cells very well, the

stratum corneum needs to be periodically replaced. The process by which this occurs is known as ecdysis.

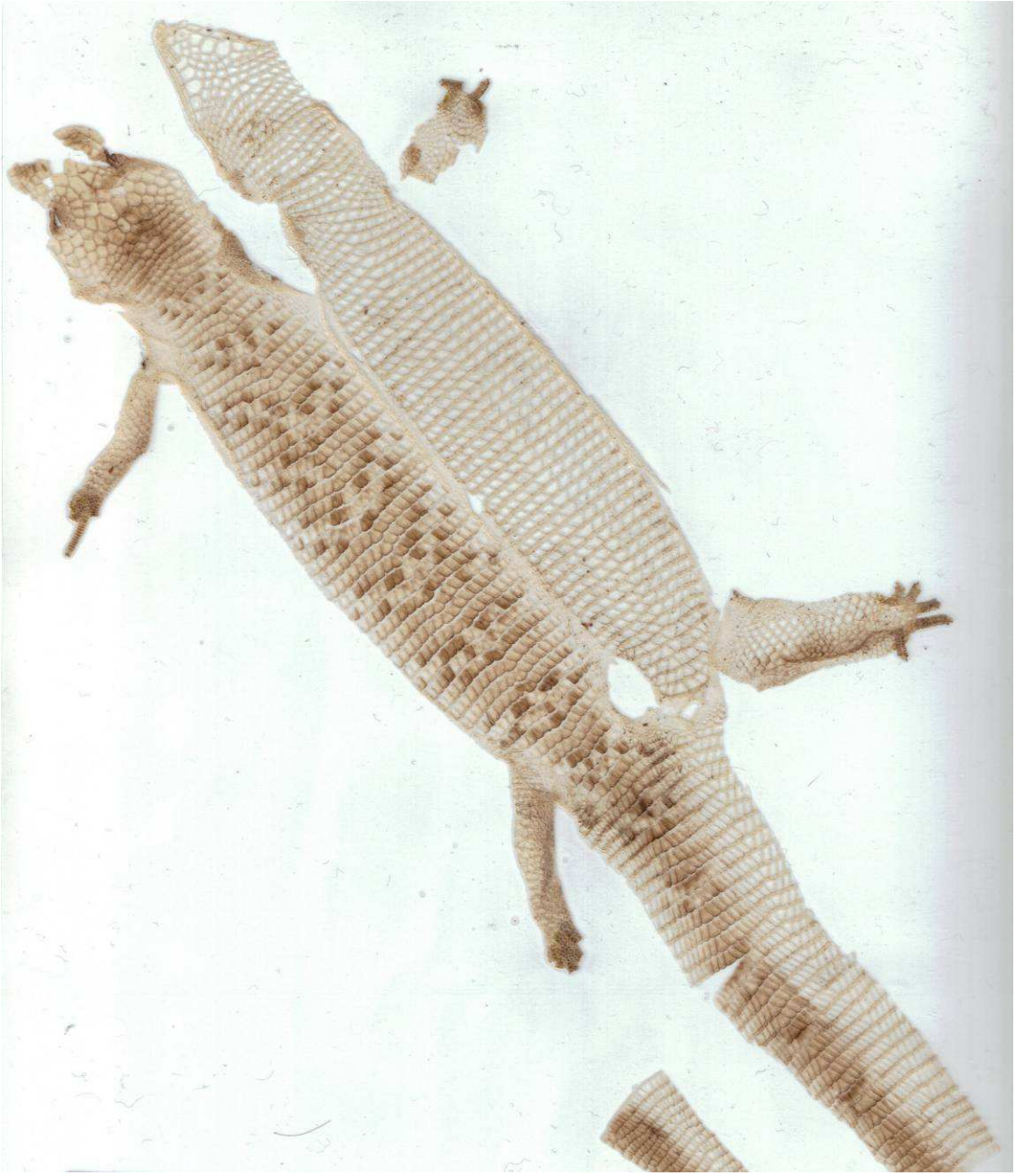


Figure 2. Shed skin of an Alligator Lizard, *Gerrhonotus* sp.

Prior to ecdysis, a new outer layer of epidermis is produced beneath the old layer. As the time of ecdysis approaches, a film of exudates is

produced between the old and new stratum corneum and separates them. The snake appears dull with its eyes being milky and opaque. During this time, vision may be impaired, causing the snake to seek shelter, usually under a cover object such as a board or flat rock. After a few days to about a week, the eyes clear, and the snake begins rubbing its snout and muzzle against the substrate, twigs, and vegetation. This rubbing causes the old layer of stratum corneum to separate from the newer layer at the rostrum and along the labials, and continues along the head and body, unrolling like a stocking being turned inside out. As the snake finishes crawling out of its "skin", the tail portion of the shed will be left pointing in the direction that the snake traveled. Fresh shed skins are moist and pliable, and are a source of food for bacteria, fungi, invertebrates (e.g. ants, sowbugs, lepidopteron larvae, and earthworms) and vertebrates such as skunks. Although rare, snakes (*Coluber constrictor* and *Storeria dekayi*) are known to consume shed skins (McCauley 1945; Ernst and Barbour 1989). Sheds therefore, do not last long in the environment.

Snakes may also shed the covering of their tongues (figure 3); however, these are rarely, if ever, found in the field. Rattlesnakes (*Crotalus* spp. and *Sistrurus* spp.) may loose segments of their rattles, which can be used as evidence of a species presence (Figure 4).

Figure 3. Shed tongue sheath from a Common Garter Snake, *Thamnophis sirtalis*.

Figure 4. Rattle of a Prairie Rattlesnake, *Crotalus viridis*.

Collecting, identifying and preserving shed skins

Before venturing out into the field to find and collect shed snake skins, you should acquire some basic tools and equipment that will aide you in the collection process.

A fundamental collecting kit consists of a note book, field tags, pens, forceps, and an assortment of bags (plastic zipper-type bags and paper lunch bags) (Figure 5). The plastic bags can be used for dry shed skins, while the paper bags are for wet or damp ones. A shed skin that is damp and placed in a plastic bag may rot and mold. When a shed skin is found, you should assign a field number to it. Field numbers should be preceded by your initials (ex. BR 654) and be sequential. Depending on the collecting bag used, paper or plastic, you should record the field number either on the bag or on a field tag, respectively. Next, you should make an entry in your note book. Data to record should include the date, locality, the number of the field tag that will be placed on or in the collecting bag, as well as the name(s) of the collector(s). A general description of the habitat where the shed skin was found is also desirable. If you have a digital camera on-hand, a photograph of the shed skin *in situ* can be taken and used to augment field notes. If you

intend your collected shed skin to serve as a voucher specimen, it is important that you record detailed and accurate locality data. If you have a GPS unit, you should obtain and record the coordinates along with the map datum used (e. g. WGS 84) for the locality. After making the entry in the note book, you can collect the shed and place it in the collecting bag. Take care not to tear the shed skin. If needed, use forceps to untangle shed skins from amongst vegetation.

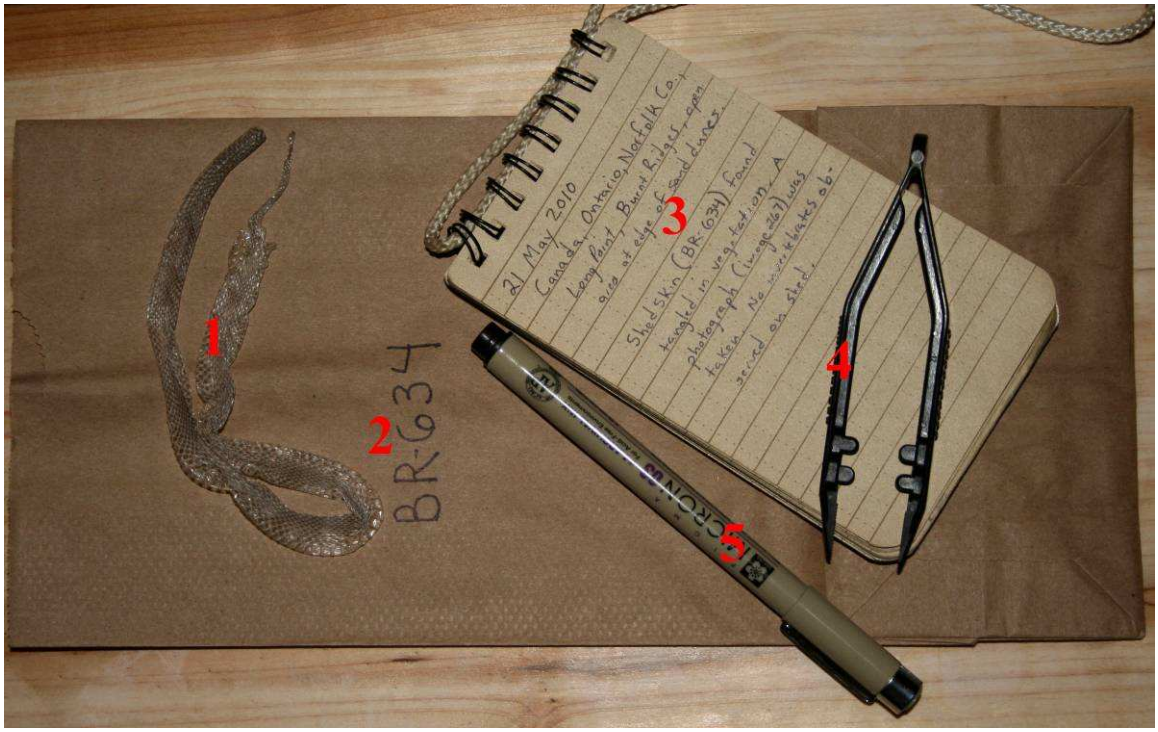


Figure 5. The minimum essentials for collection and identification of shed skins include: 1) the shed skin; 2) a bag with a field number on it: 3) a notebook to record data; 4) forceps to extract and pick up shed skin; 5) a permanent ink pen for making entries in notebook.

Most shed skins will need to be cut, spread and mounted prior to identification. For this stage, you should have dissecting scissors, fine pointed forceps, teasing needle, dropper, parchment or wax paper, 70%

isopropyl alcohol, and a plant press. When preparing a shed skin for mounting, the following steps should be taken.

1. Write the field number of the shed skin on the lower right hand corner of the sheet of parchment paper.

2. Cutting the shed skin. Although shed skins can be mounted whole, it is recommended that they are prepared in three sections: anterior (cephalic), midbody, and posterior (cloaca/tail). To do this, first fold the shed skin so that the head is adjacent to the anal plate. Next, cut across the shed skin about midway between where the head and anal plate align and the bend (Figure 6). With the anterior section, make a cut from the angle of the mouth to the center of the tenth ventral, then continue cutting away from the head, through the middle of the remaining ventrals. With the midbody section, locate the ventral side and cut down through the ventrals so that the shed will open. Finally, the posterior section can be cut. Cut through the middle of the ventral scales until you reach the fifth ventral above the anal plate. At this point, make a cut from the fifth ventral above the anal plate to the vertebral row above the anal plate and cut along the vertebral row to the tip of the tail.

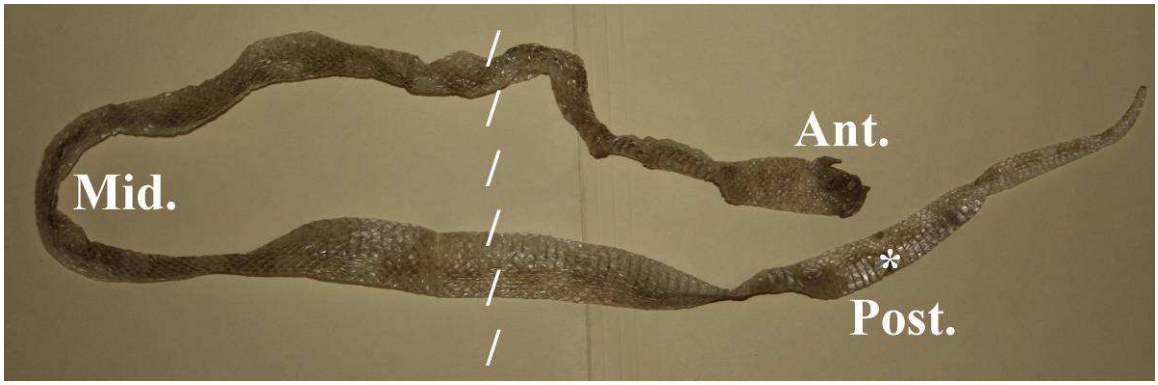


Figure 6. To cut a shed skin into anterior (Ant.), midbody (Mid.), and posterior (Post.) sections; fold as in the image and cut across dashed line. * denotes location of anal plate.

3. Spreading the shed skin. Place each section on the parchment paper; use additional sheets of paper if necessary. Generously apply alcohol to each section. Next, use a teasing needle and forceps to open and spread each section, making sure to remove any wrinkles and creases. I sometimes use my index fingers to spread shed skins. Use a paper towel to remove excess alcohol. The shed skin sections should appear like those in the plates.

4. Pressing the shed skin. The final step prior to identification is to place the parchment paper with the spread sections of shed skin in a plant press. The parchment paper should be placed between blotters, then between ventilators, and finally in the actual press. After tightening and securing the straps, the shed skin should be left in the press for at least twenty-four hours (Figure 7). After the shed skin sections are pressed and dry, any remaining dirt can be removed with a soft brush. Consult the plates in the species accounts for illustrations of how the spread shed skin sections should appear.

Figure 7. Plant presses are useful in the preparation of shed skins; a few sizes are displayed in this image.

To identify the shed skin that was found, you will need either a hand lens (at least 10x) or a stereo microscope and a dichotomous key (see below).

Before attempting to identify shed skins with the following key, it is recommended that the reader familiarize themselves with the characters illustrated in plates 1 and 2, and defined in the glossary. The following key is composed of a series of paired descriptions. To use the key, start by reading the first pair (1a and 1b), and decide which of the two statements best fits the shed skin in hand. At the end of each description will be either a number, directing you to the next couplet, or a name, identifying the species the shed belongs. For example, if you found your shed skin in Alberta, you would choose 1a, which ends with the number 2. Therefore you would proceed to the second couplet (2a and 2b). You examine the shed and determine it has keeled scales, and so you'd choose 2b, which directs you to couplet 8. After reading both 8a and 8b, you choose 8a, because the dorsal scales on the shed skin have apical notches. Since 8a ends with 9, you go to the ninth couplet and read 9a and 9b. Your shed skin has 15 scale rows at midbody and three posterior supralabials, thus best fitting 9a. You now have the identification of your shed skin - Redbelly Snake, *Storeria occipitomaculata*. Species that are listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as either endangered, threatened or of special concern are indicated with an asterisk in the key (see Seburn and Brooks [2007] for specific designations).

Once identification is made with the key, the user should check the species account and accompanying plate to confirm their identification. Check to make sure the descriptions of scalation, pigmentation, and geographic distribution match your shed skin. If the user of this guide has

trouble making an identification, they can scan the shed skin in question, and email the image to the author: (brachystoma@hotmail.com). The resolution of the scanned images should be at least 300 dpi. Please include the general locality (nearest town, Province) with your email. It should be noted that some shed skins from anomalous individuals may not key out correctly.

If the shed skin is identified as a species that is threatened, endangered, or of special concern, you should have it verified by a herpetologist (check with a local natural history museum or university). It is imperative that your detailed and accurate field notes accompany the shed skin. If the shed skin is not from a threatened or endangered species it may still prove valuable. For instance, it could represent a range extension; be the only evidence of a species presence in an area; or shed light on an individual's or species habitat preferences during ecdysis. A shed skin, if properly handled and stored, may also serve as a source of genetic material for molecular studies. Nature centers and schools may also be interested in shed skins for use in educational programs. Shed skins have also been used in arts and crafts projects. If you plan on depositing it in a museum, you should first contact the museum and find out whether or not they want the shed skin. If you don't have accurate locality and collection data for the shed skin, it will be of little or no scientific value. Users of this guide should consult Simmons (2002) for pertinent information regarding acceptable collecting procedures.

There are several methods to store or preserve shed skins. The easiest is to store them dry in containers, such as a jars or plastic bags. If they are going to be used in a molecular study, Burbrink and Castoe (2009) recommend that shed skins be placed in plastic bags and stored in an ultra-cold freezer. Shed skins can also be laminated (Figure 8). This is especially

desirable if the shed skins are to be used in educational programs requiring excessive handling. I prefer thermal laminators over the no-heat models. It has been my experience that the former produce a better seal with fewer air bubbles than no-heat models.

Figure 8. A thermal laminator, as shown here, is essential in preserving and protecting fragile shed skins.

Materials and methods

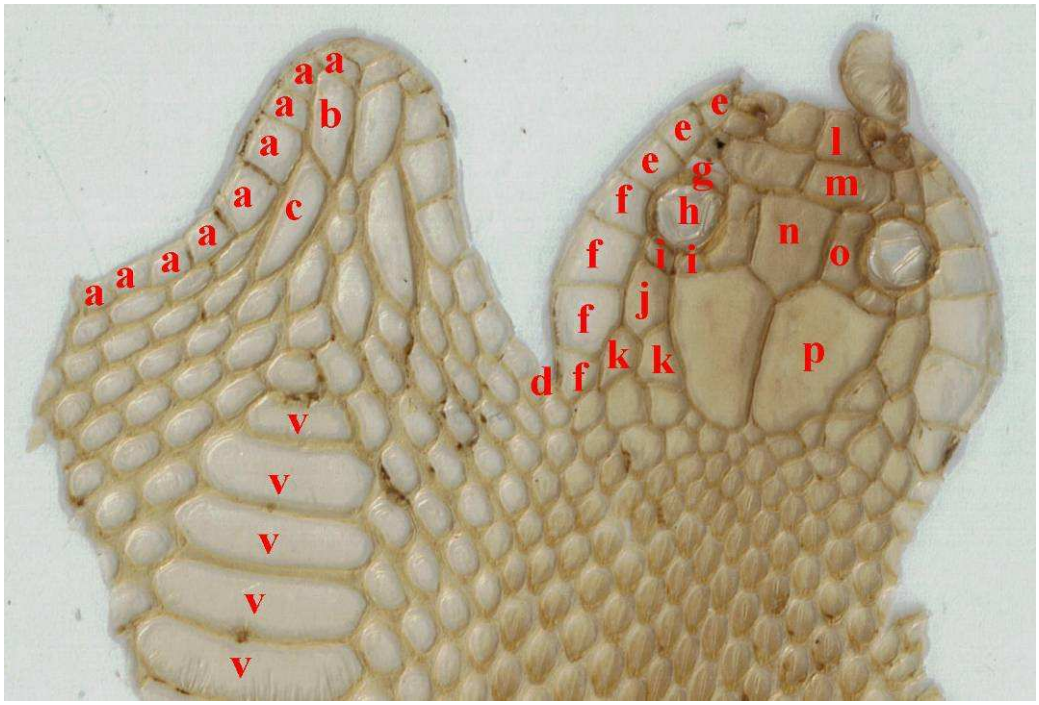
During the preparation of this guide, 496 shed skins of 24 species (including *Crotalus horridus*) were examined. Shed skins were prepared as described in Gray (2005). A stereomicroscope (10–30x magnification) was used to make scale counts and examine scale morphology. Shed skins for three species, the Western Racer, *Coluber mormon*, Northern Pacific Rattlesnake, *Crotalus*

oreganus, and Desert Night Snake, *Hypsiglena chlorophaea* were not available. Several references (see species accounts) were used to augment the shed skin scalation data. The images (head, midbody and anal plate regions) for the figures and plates were obtained from actual shed skins by scanning on a flatbed scanner with resolution ranging from 300 to 600 dpi. Images of magnified dorsal scales were obtained with a Celestron® (model #44306) handheld digital microscope with attached 2.0 MP digital camera.

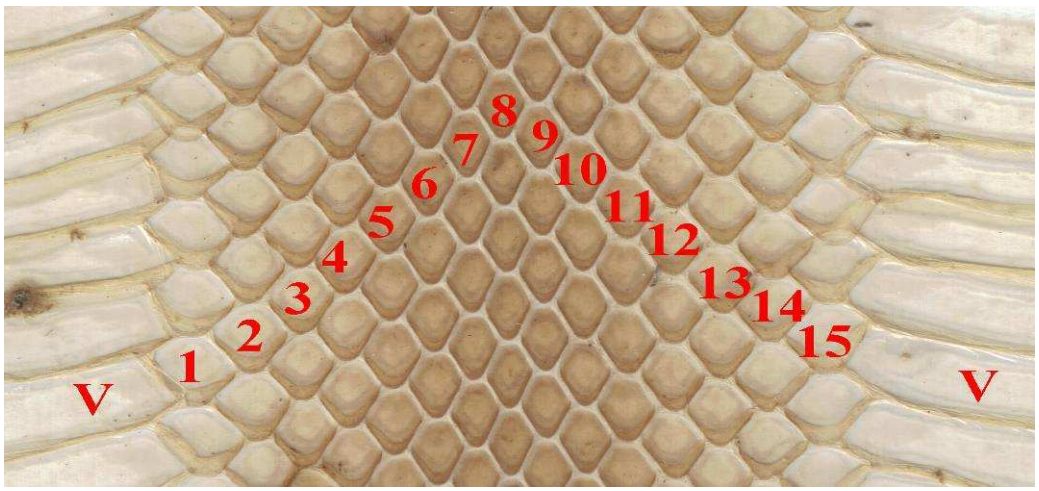
Common and scientific names used in this guide follow those given in Collins and Taggart (2009).

Before attempting to identify shed skins, it is recommended that the reader familiarize themselves with the characters illustrated in plates 1 and 2 and defined in the following glossary.

PLATE 1

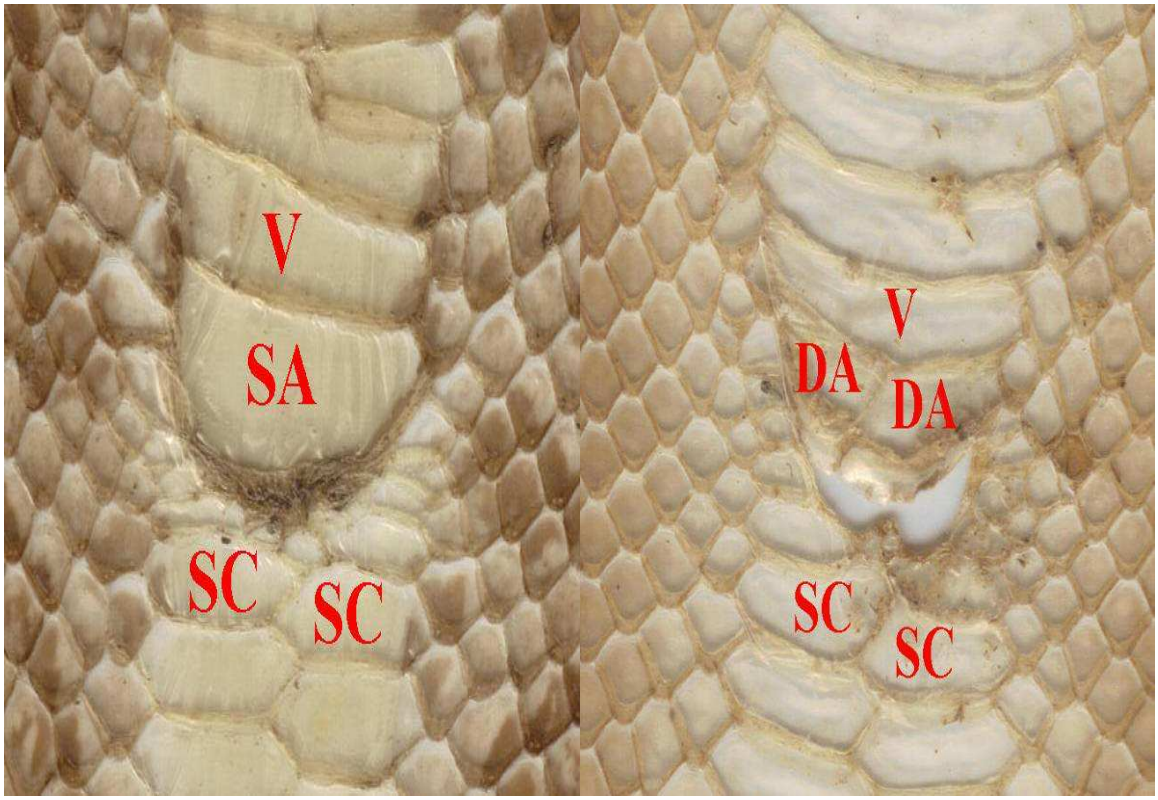


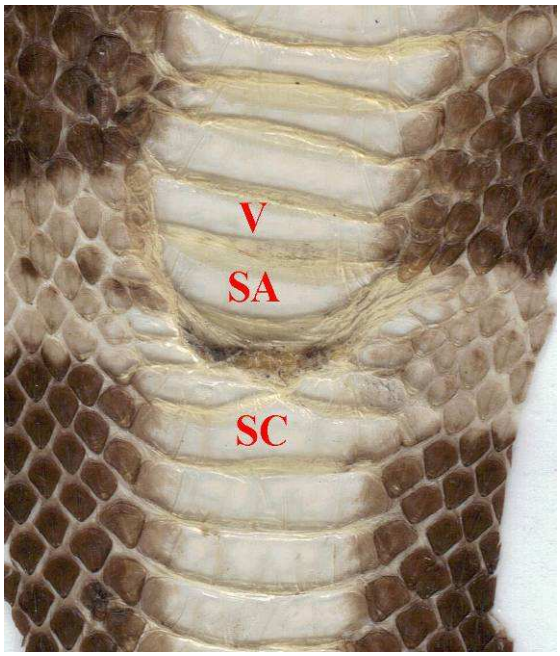
Scalation. a: infralabials, b: anterior chin shield, c: posterior chin shield, d: angle of the mouth, e-f: supralabials, f: posterior supralabials, g: preocular, h: spectacle, i: postoculars, j: anterior temporal, k: posterior temporals, l: internasal, m: prefrontal, n: frontal, o: supraocular, p: parietal, v: ventral scales.



Counting Dorsal Scale Rows (DSR) 1-15. V: ventral scale.

PLATE 2





Upper left: *Lampropeltis triangulum*. SA: single (entire) anal plate. SC: divided (paired) subcaudals. V: ventral scale.

Upper right: *Coluber constrictor*. DA: divided anal plate. SC: divided subcaudals. V: ventral scale.

Left: *Crotalus horridus*. SA: single anal plate. SC: single (entire) subcaudal. V: ventral scale.

Glossary

Anal plate: A scale covering the opening to the cloaca; the anal plate may be single (entire) or divided (paired).

Angle of the mouth: The point where the supralabials and infralabials meet.

Anterior: Towards the head or the front portion of a shed.

Apical notch: A median indentation on the posterior tip (apex) of a dorsal scale.

Apical pit(s): Slight depression(s) located on the apex of dorsal scales in some species of snakes. They may be single or paired, and are usually not pigmented in shed skins.

Azygous scale(s): Small scale or scales located behind the rostral scale and between the internasals.

Chin shields: Scales located on the lower jaw between the infralabials; they are paired and usually consist of an anterior and posterior pair.

Dorsal scales: Scales covering the body, above the ventral scales and between the head and tail. They may be smooth or keeled. Furthermore, keeled scales may be notched or lack a notch.

Dorsal scale rows (DSR): Dorsal scales are located on the body, and occur

in rows above the ventral scales; they are counted as illustrated in Plate 1. They may be counted anteriorly, at approximately the tenth ventral; at midbody; or posteriorly at approximately the fifth ventral above the anal plate. In this guide, unless otherwise stated, DSR refers to a midbody count.

DSR 1/VR: see **Relative width of dorsal scale row 1**.

Frontal scale: A median plate on the head, located between the supraoculars and anterior to the parietals.

Infralabials: The scales covering the lower lips of snakes.

Keeled scales: Dorsal scales containing a raised ridge (keel) running longitudinally along the scale.

Lateral stripe: A light or dark stripe located along the side of the body.

Parietal scales: Plates on top of the head, behind the frontal and supraocular scales.

Pattern: The presence of shapes created by the presence and or absence of pigment in a shed skin. Schmidt and Davis (1941) defined the following patterns (Since shed skins lack "color" I have replaced the word color in their definitions with pigment.):

Band: a wide (more then 2 scale rows) line of pigment running lengthwise.

Blotch: a large rounded or squarish marking, usually with a narrow dark border.

Crossband: a half-ring of pigment extending across the sides and back, but not across the belly.

Stripe: a narrow line of pigment (or lacking pigment) running lengthwise.

Uniform: solid pigment, without any markings.

Plate: Any enlarged scale.

Posterior supralabials (POSL): The upper lip scales (supralabials) between and including the last to contact the spectacle and the last in the series at the angle of the mouth.

Postoculars: Small scale or scales located behind and contacting the eye or spectacle.

Relative width of dorsal scale row 1 (DSR1/VR): The value for this character is obtained by measuring the width of a scale in the first dorsal row and dividing by the width of a corresponding vertebral scale. At least ten such measurements should be made and a mean calculated.

Rostral: The scale that covers the tip of the snout.

Spectacle: The clear scale covering the eye.

Subcaudals: Scales located on the underside of the tail. They may be either entire (single) or divided (paired).

Subocular(s): Small scales located below and in contact with the eye or spectacle, and above the supralabials.

Supralabials: The scales covering the upper lip of a snake.

Temporals: Scales located behind the postoculars and below the parietals and above the posterior supralabials. There are usually anterior and posterior temporals. Usually written as a formula, such as 1+2, meaning one anterior and two posterior temporals.

Vent: The opening to the cloaca that is covered by the anal plate.

Ventral scales: Plate-like scales that are usually wider than long and cover the belly of snakes.

Vertebral stripe: A narrow, lightly pigmented line running lengthwise along the middle of the back.

Key to the shed skins of the snakes of Canada

1a. Shed skin found in western Canada: British Columbia, Alberta, Saskatchewan, or Northwest Territory……2

1b. Shed skin found in eastern Canada: Manitoba, Ontario, Quebec, or the Maritime Provinces……..……..….16

2a. Scales smooth (figure 9)……...……3

2b. Scales keeled (figure 10)...……....8

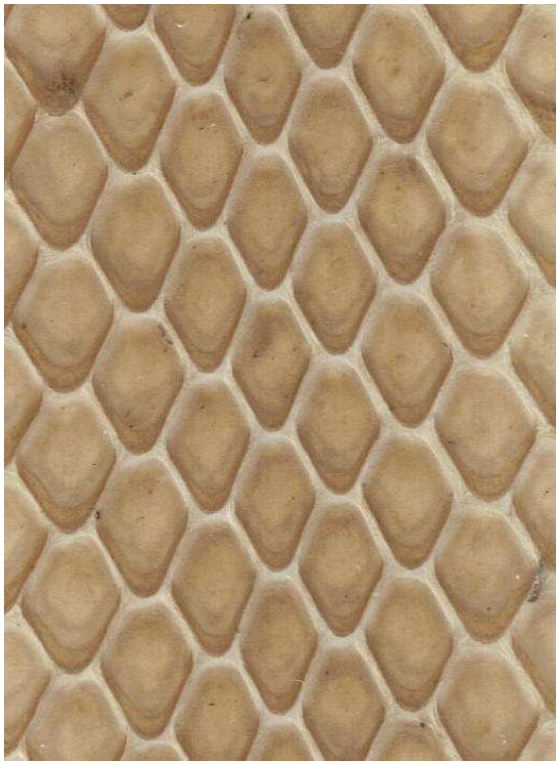


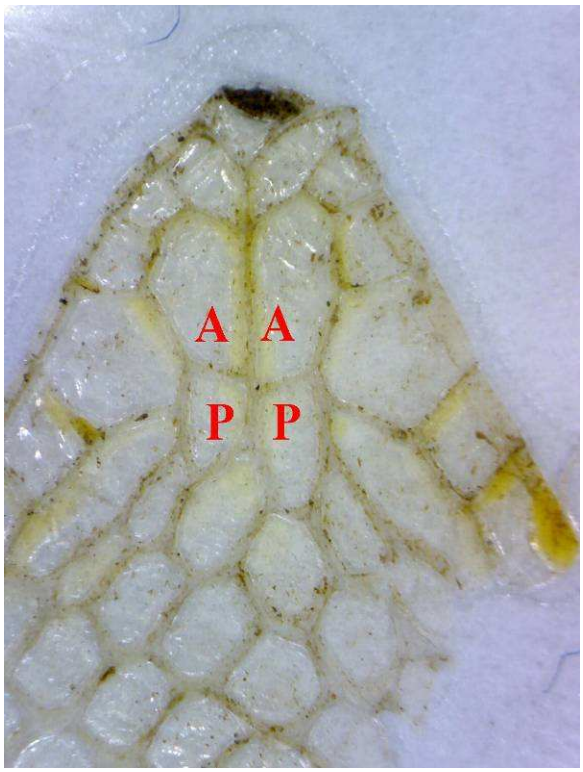
Figure 9. (above left) Smooth scales lack a median keel.
Figure 10. (above right) Keeled scales have a median longitudinal keel.

3a. Dorsal scale rows (DSR) 15…….……4

3b. DSR 17 or more……5

4a. Posterior chin shields reduced and shorter then anterior (figure 11); shed skin found in southwestern British Columbia, Vancouver Island…... **Sharptail Snake, *Contia tenuis**** (pg. 56)

4b. Posterior chin shields equal or longer than anterior (figure 12); shed skin found in southeastern Saskatchewan…..**Smooth Green Snake, *Liochlorophis vernalis*** (pg. 74)



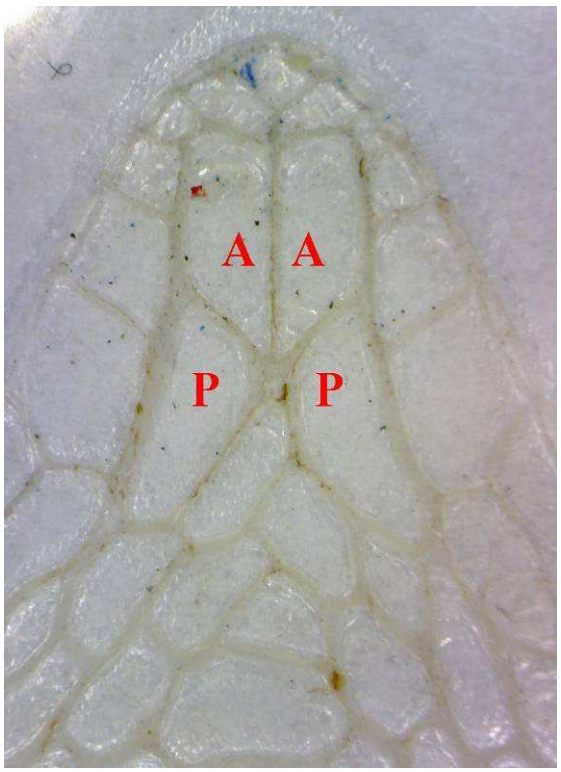


Figure 11. (above left) Posterior chin shields (P) are reduced when they are equal in length or shorter than the anterior pair (A).
Figure 12. (above right) Image of posterior chin shields that are longer than the anterior pair.

5a. DSR 17……..6

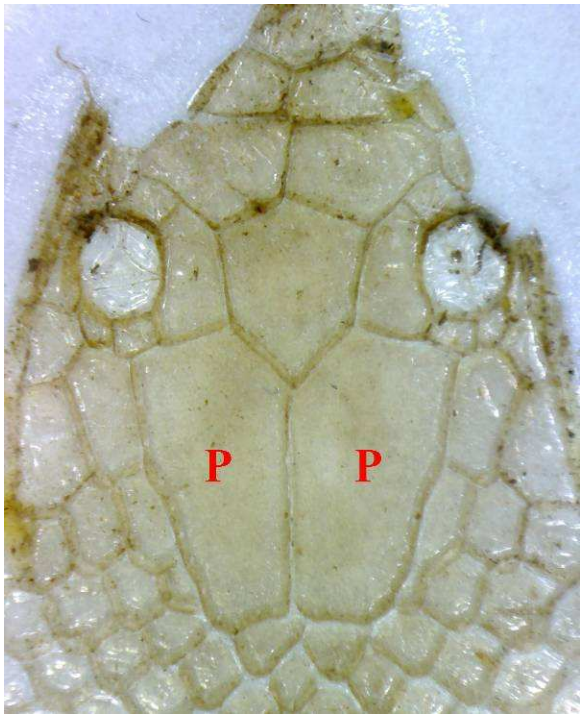
5b. DSR 21 or more……7

6a. Shed skin found in south-central British Columbia…….. **Western Racer, *Coluber mormon**** (pg. 54)

6b. Shed skin found in southcentral Saskatchewan……...…..**Eastern Racer, *C. constrictor*** (pg. 52)

7a. DSR 21, scales on head normal, parietals not reduced (figure 13), ventrals normal…….……**Desert Night Snake, *Hypsiglena chlorophaea**** (pg. 68)

7b. DSR 32 or more; parietals reduced (figure 14); ventral scales reduced (Figure 15)…….**Northern Rubber Boa, *Charina bottae**** (pg. 50)



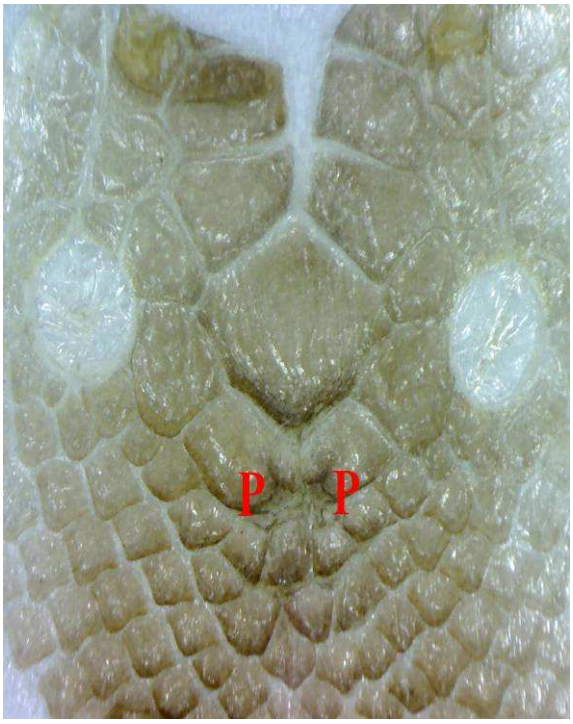


Figure 13. (above left) Normal arrangement of head scales. The parietals are indicated with a "P".
Figure 14. (above right) Reduced parietal scales (P) of *Charina bottae*.

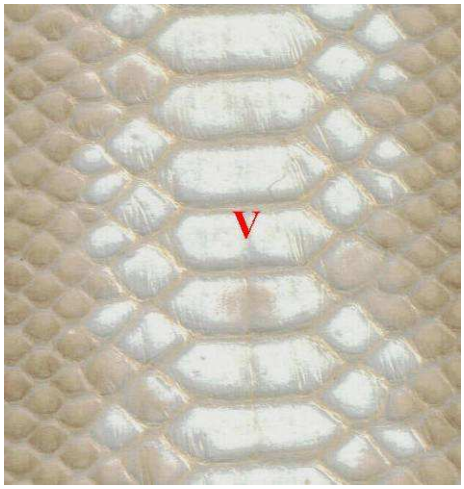


Figure 15. Reduced ventral scales (V).

8a. Dorsal scales with an apical notch (figure 16)…….....…9

8b. Dorsal scales lack an apical notch, apex rounded (figure 17) ……...…….……..13

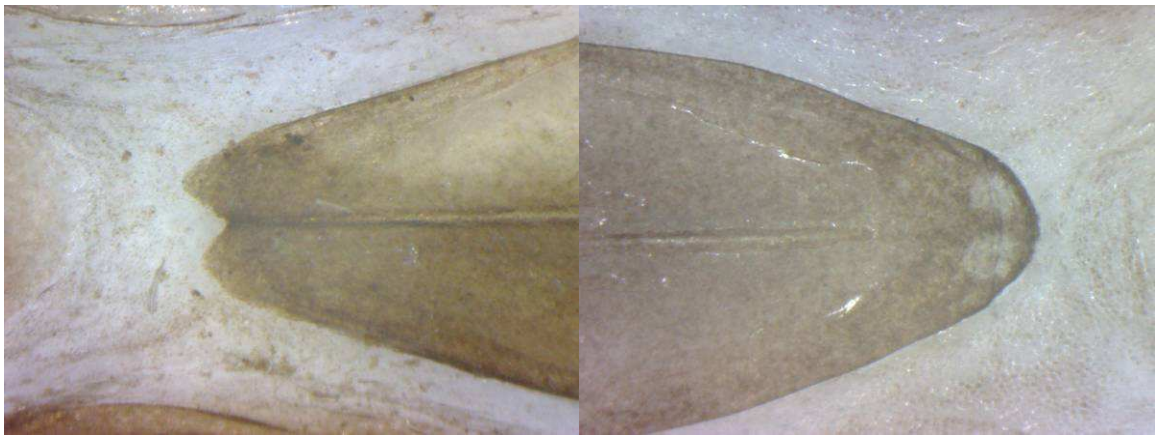


Figure 16. (above left) Apex of a dorsal scale with an apical notch.
Figure 17. (above right) Apex of a dorsal scale lacking an apical notch.

9a. DSR 15; posterior supralabials (POSL) 3 (figure 18); anal plate divided (Figure 19)…….**Redbelly Snake, *Storeria occipitomaculata*** (pg. 82)

9b. DSR 17 or more; anal plate not divided (figure 20)……10

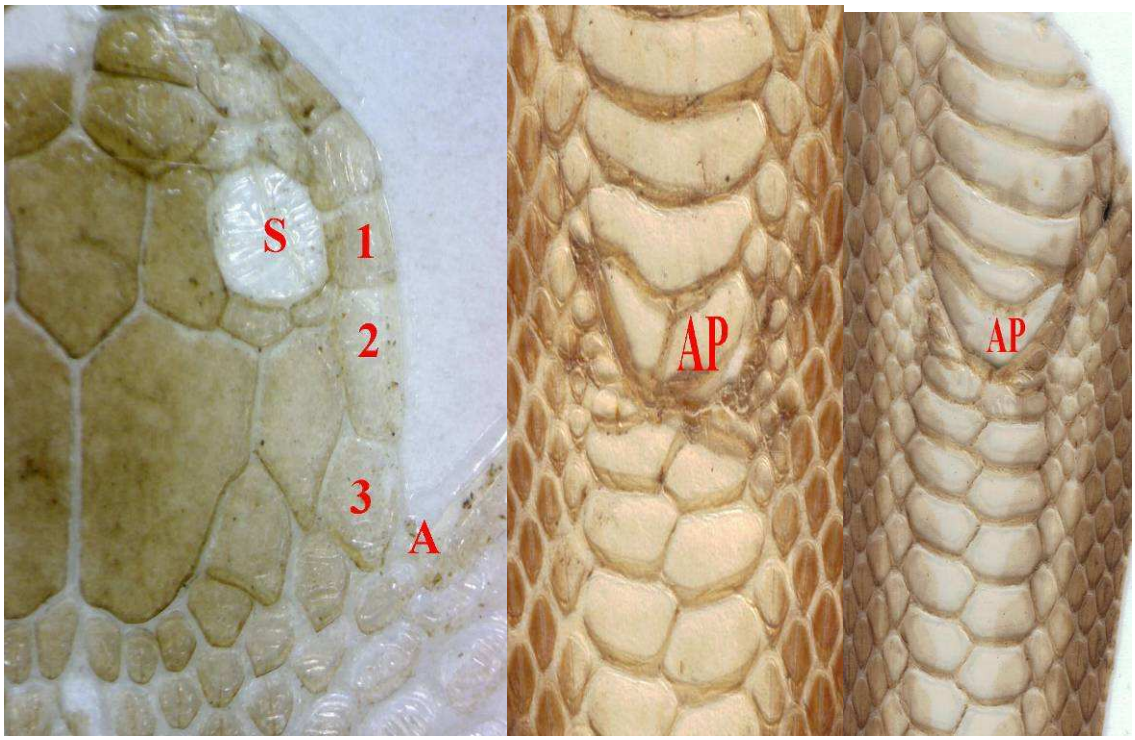


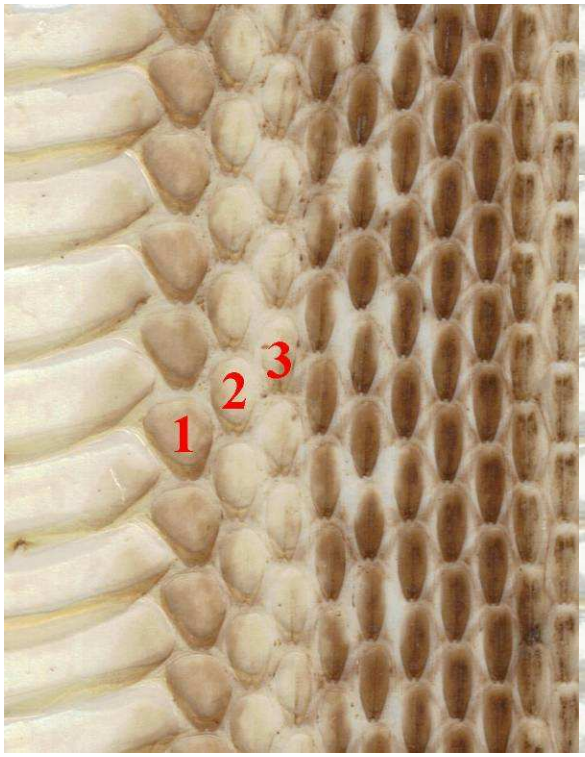
Figure 18. (above left) Three Posterior Supralabials (POSL), numbered 1-3. POSL 1 (1) is the most posterior supralabial to contact the spectacle (S); the last POSL (in this case number 3) is located at the angle of the mouth (A).
Figure 19. (above center) A divided anal plate (AP).
Figure 20. (above right) An entire anal plate (AP).

10a. DSR at midbody 17, fifteen near vent; shed skin found in southwest British Columbia……..…**Northwestern Garter Snake, *Thamnophis ordinoides*** (pg. 88)

10b. DSR at midbody 19 or 21, seventeen near vent……..…..…11

11a. Light lateral stripe on DSR 2 and 3 (Figure 21)……..……12

11b. Light lateral stripe on DSR 3 and 4 (Figure 22)..... **Plains Garter Snake, *T. radix*** (pg. 90)



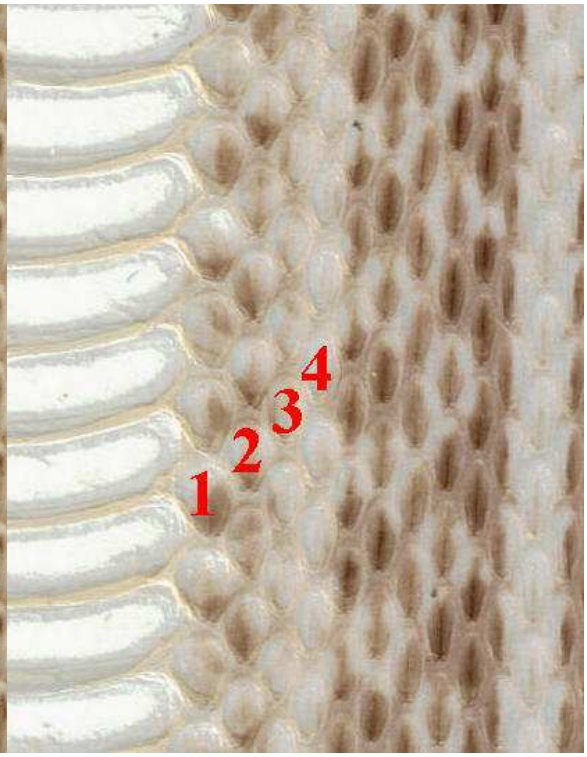
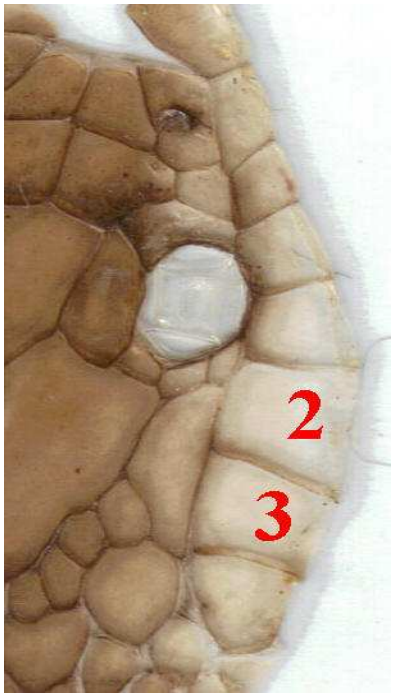


Figure 21. (above left) Image of the lateral stripe occurring on DSR 2 and 3.
Figure 22. (above right) Image of the lateral stripe occurring on DSR 3 and 4.



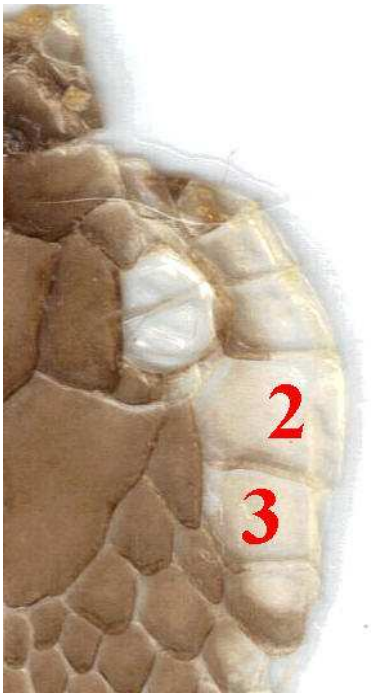


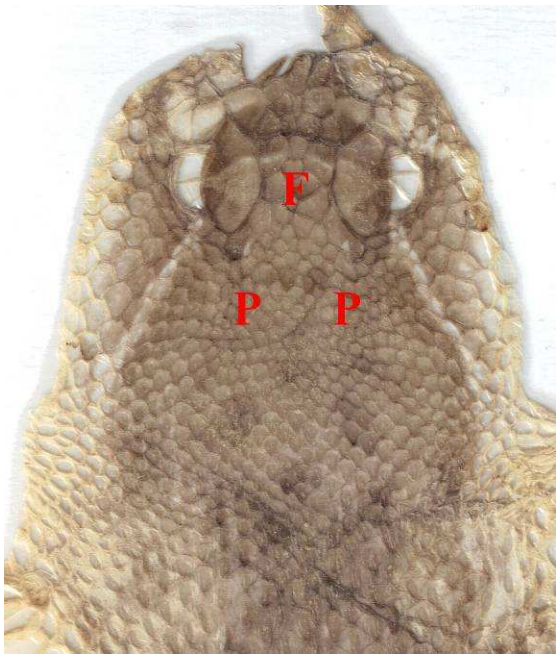
Figure 23. (above left) Second POSL not higher than broad. Posterior supralabial 3 may be equal to, or slightly higher than broad.
Figure 24. (above right) Both POSL 2 and 3 are higher than broad.

12a. DSR usually 19; second and third POSL not higher than broad (Figure 23); posterior chin shields longer than anterior……**Common Garter Snake, *T. sirtalis*** (pg. 94)

12b. DSR usually 21; second and third POSL higher than broad (Figure 24); anterior and posterior chin shields about equal in length ……**Western Terrestrial Garter Snake, *T. elegans*** (pg. 86)

13a. Many small scales in the frontal and parietal area (Figure 25); DSR 23-27, with small, sometimes indistinct apical pits…….....…...14

13b. Scales in frontal and parietal area normal; apical pits relatively large and distinct (Figure 26)….……..15



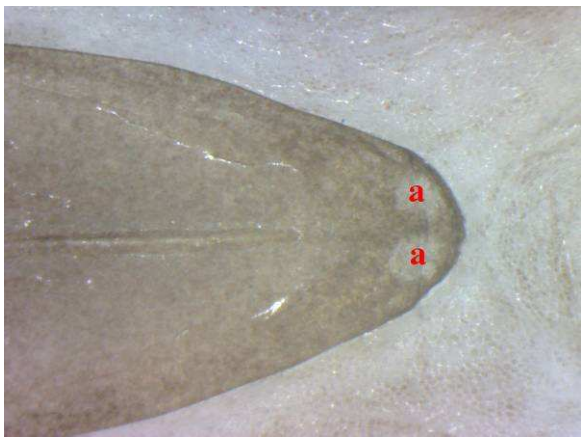


Figure 25. (above left) Frontal (F) and Parietal (P) areas with numerous small scales present.
Figure 26. (above right) Paired and distinct apical pits (a) on a dorsal scale.

14a. Shed skin found in British Columbia……..…….**Northern Pacific Rattlesnake, *Crotalus oreganus**** (pg. 96)

14b. Shed skin found in Saskatchewan or Alberta……...**Prairie Rattlesnake, *C. viridis*** (pg. 98)

15a. DSR 23-25; spectacle separated from supralabials by suboculars (Figure 27)……**Western Hognose Snake, *Heterodon nasicus*** (pg. 64)

15b. DSR 27 or more; at least one supralabial contacts spectacle (Figure 28)….....**Gopher Snake, *Pituophis catenifer**** (pg. 76)

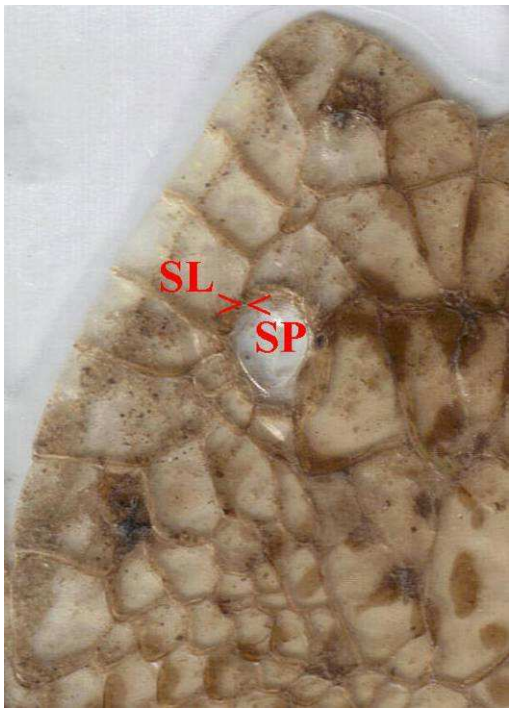


Figure 27. (above left) Spectacle (SP) separated from supralabials (SL) by row of small scales.
Figure 28. (above right) Supralabial (SL) in contact with spectacle (SP).

16a. Scales smooth (Figure 9)……...17

16b. Scales keeled (Figure 10)...……...……20

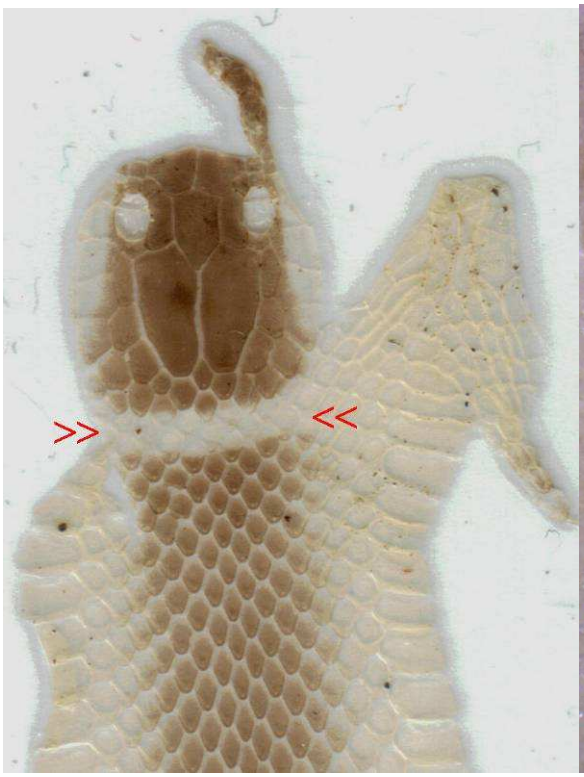
17a. DSR 15……...…18

17b. DSR 17 or more……19

18a. Unpigmented collar on nape (Figure 29); single apical pit on dorsal scales is distinct (Figure 30)……..……**Ringneck Snake, *Diadophis punctatus*** (pg. 58)

18b. No collar on nape; apical pits, if present, not distinct……...…

Smooth Green Snake, *Liochlorophis vernalis* (pg. 74)



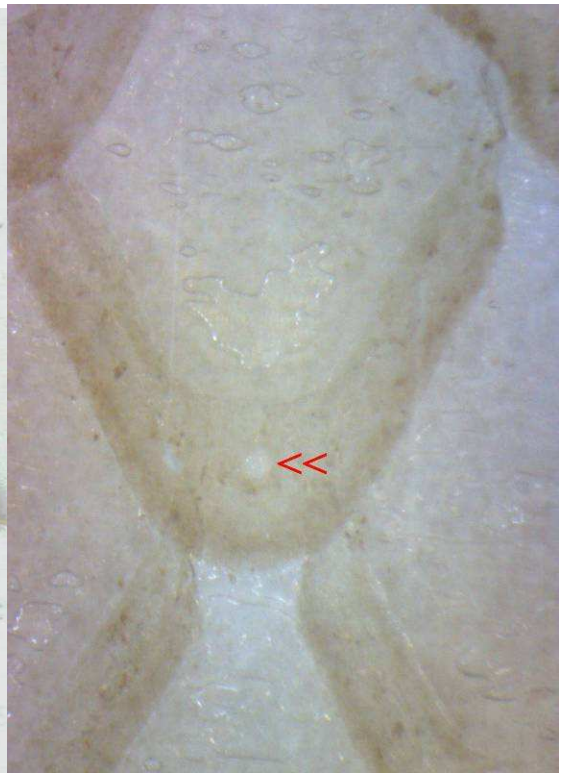


Figure 29. (above left) Image of the unpigmented collar of the Ringneck Snake, *Diadophis punctatus*.
Figure 30. (above right) Image of a dorsal scale with a single apical pit (indicated by the two arrows).

19a. DSR 17; uniform pattern on shed skin……..……...**Eastern Racer, *C. constrictor**** (pg. 52)

19b. DSR 19 or 21; blotched pattern on shed skin ……..…..…**Milk Snake, *Lampropeltis triangulum**** (pg. 70)

20a. Dorsal scales are notched (Figure 16)……..….21

20b. Dorsal scales lack an apical notch (Figure 17)……...……...30

21a. DSR 15; POSL 3…….**Redbelly Snake, *S. occipitomaculata*** (pg. 82)

21b. DSR 17 or more; POSL 4…….22

22a. Pattern either uniform, or with crossbands and or blotches……..23

22b. Pattern consists of light lateral stripes, with or without a vertebral Stripe……..……..…….……..26

23a. DSR 17; last three POSL contact anterior temporal (Figure 31)…… **Brown Snake, *S. dekayi*** (pg. 80)

23b. DSR 19 or more; only two POSL contact anterior temporal (Figure 32) ……...24

24a. DSR 21 or more; pattern blotched or crossbanded…….……..**Northern Water Snake, *Nerodia sipedon**** (pg. 72)

24b. DSR less than 21……..25

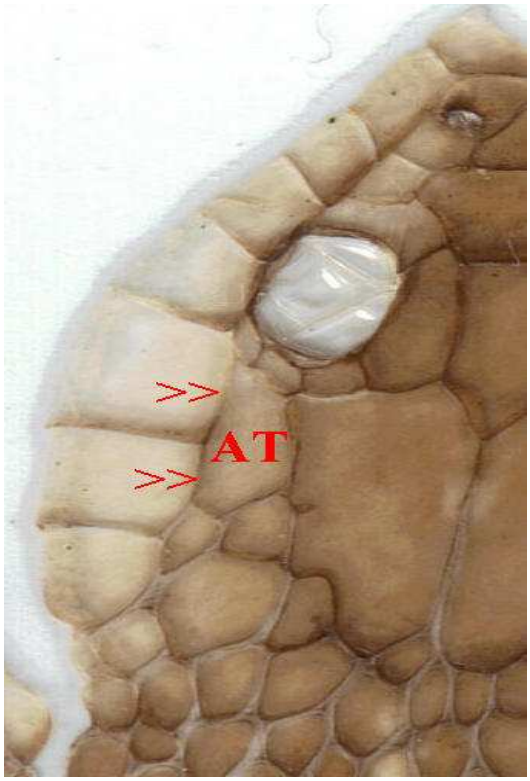


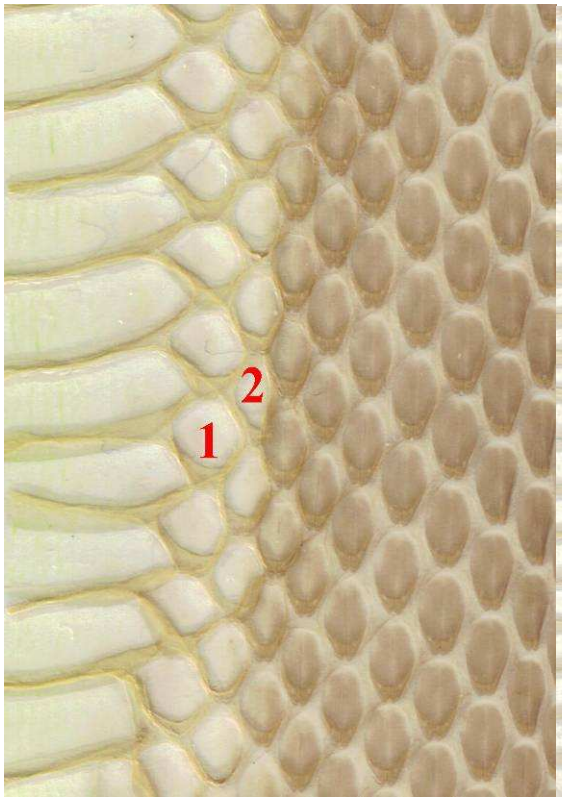
Figure 31. (above left) The last three POSL in contact with the anterior temporal (AT).
Figure 32. (above right) Two POSL in contact with the anterior temporal (AT).

25a. DSR 1 and 2 not pigmented, lighter than those above (Figure 33); postoculars usually 2……..……**Queen Snake, *Regina septemvittata**** (pg. 78)

25b. DSR 2 and 3 lighter than those above (Figure 21); postoculars usually 3 or 4……**Common Garter Snake, *T. sirtalis*** (pg. 94)

26a. Lateral stripe on DSR 1 and 2; no vertebral stripe (Figure 33)…… ……..…**Queen Snake, *R. septemvittata**** (pg. 78)

26b. Lateral stripe on DSR 2 and 3 or DSR 3 and 4; a vertebral stripe is usually present (Figure 34)……...……..27



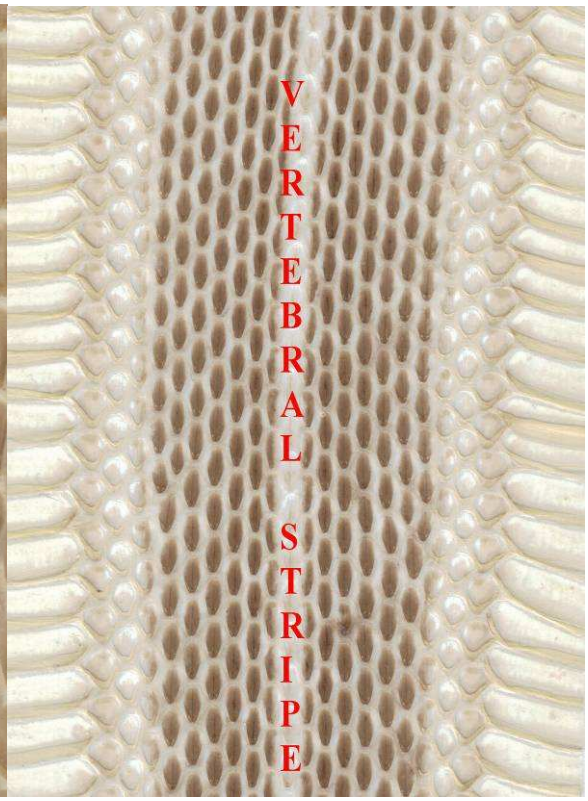


Figure 33. (above left) Dorsal scale rows (DSR) 1 and 2 unpigmented in *Regina septemvittata*.
Figure 34. (above right) Vertebral stripe in *Thamnophis* spp.

27a. Lateral stripe on DSR 2 and 3 (Figure 21)…….. **Common Garter Snake, *T. sirtalis*** (pg. 94)

27b. Lateral stripe on DSR 3 and 4 (Figure 22)……..28

28a. Vertebral stripe extends onto parietals (Figure 35); relative width of DSR 1 (DSR1/VR) equal to or less than 2.0……...**Eastern Ribbon Snake, *T. sauritus**** (pg. 92)

28b. Vertebral stripe does not usually extend onto parietals, if it does, barely; DSR1/VR greater than 2.0…….29

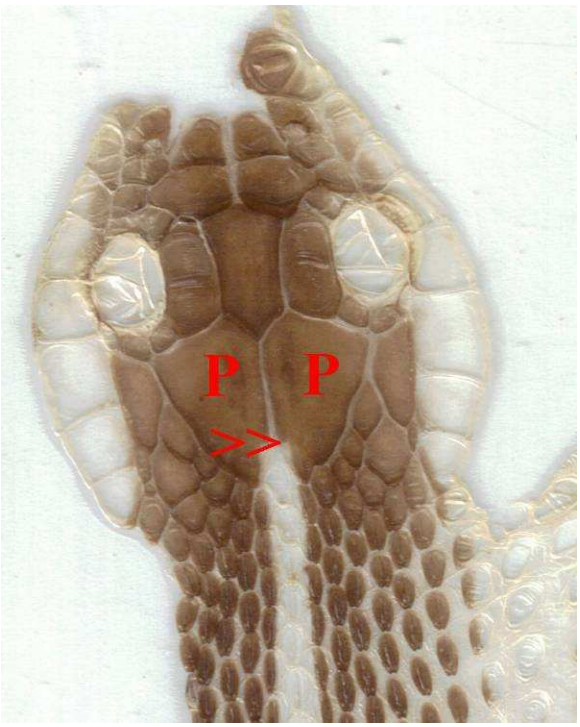


Figure 35. Vertebral stripe extends well onto parietal scales (P).

29a. DSR 19; shed skin found in Ontario……**Butler's Garter Snake, *T. butleri**** (pg. 84)

29b. DSR usually 21, but occasionally 19; shed skin found in Manitoba…… **Plains Garter Snake, *T. radix*** (pg. 90)

30a. Spectacle separated from supralabials by suboculars (Figure 27)……31

30b. At least one supralabial contacts spectacle (Figure 28)……..……..33

31a. Dorsal blotches uniformly pigmented (Figure 36), and may fuse with lateral blotches; subcaudal scales paired (Figure 37)...……32

31b. Dorsal blotches dichromatic (Figure 38), with dark edges, rarely fused with lateral blotches; subcaudal scales mostly entire (Figure 39)…….. **Massasauga, *Sistrurus catenatus**** (pg. 100)

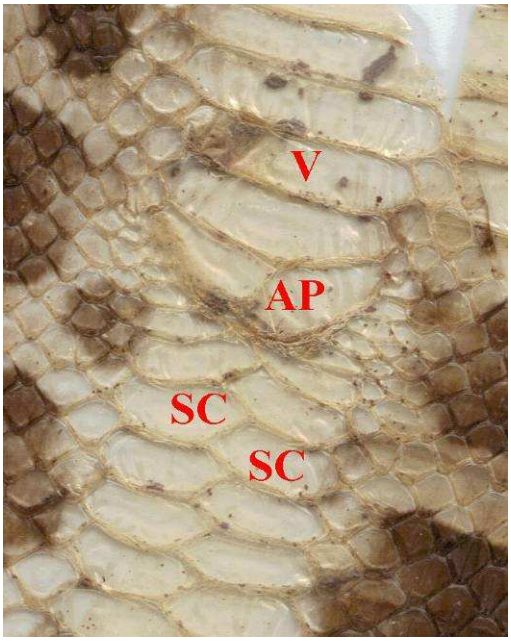
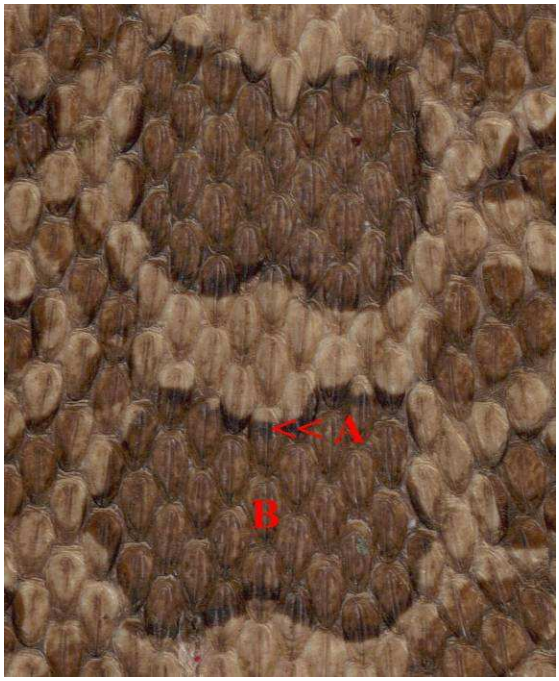


Figure 36. (above left) Uniformly pigmented dorsal blotches lack a well-defined dark border.
Figure 37. (above right) Image of divided (or paired) subcaudal scales (SC). AP: anal plate. V: ventral scale.



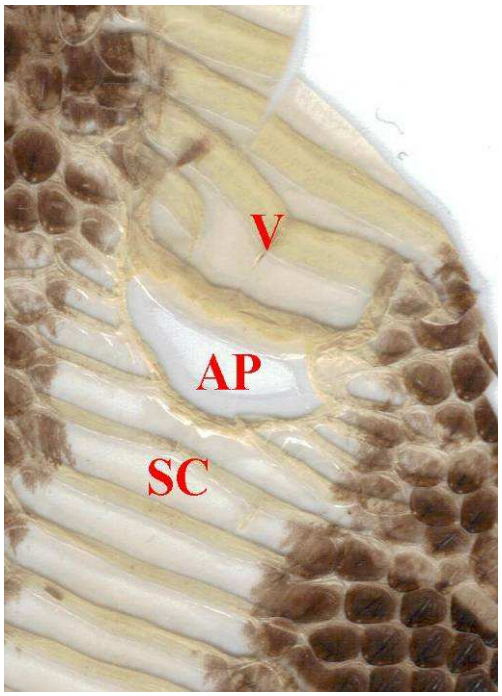


Figure 38. (above left) Dichromatic dorsal blotches (B) have a well-defined dark border (A).
Figure 39. (above right) Image of entire subcaudal scales (SC). AP: anal plate. V: ventral scale

32a. Shed skin found in southern Manitoba……...**Western Hognose Snake, *H. nasicus*** (pg. 64)

32b. Shed skin found in found in southern Ontario…..**Eastern Hognose Snake, *H. platirhinos**** (pg. 66)

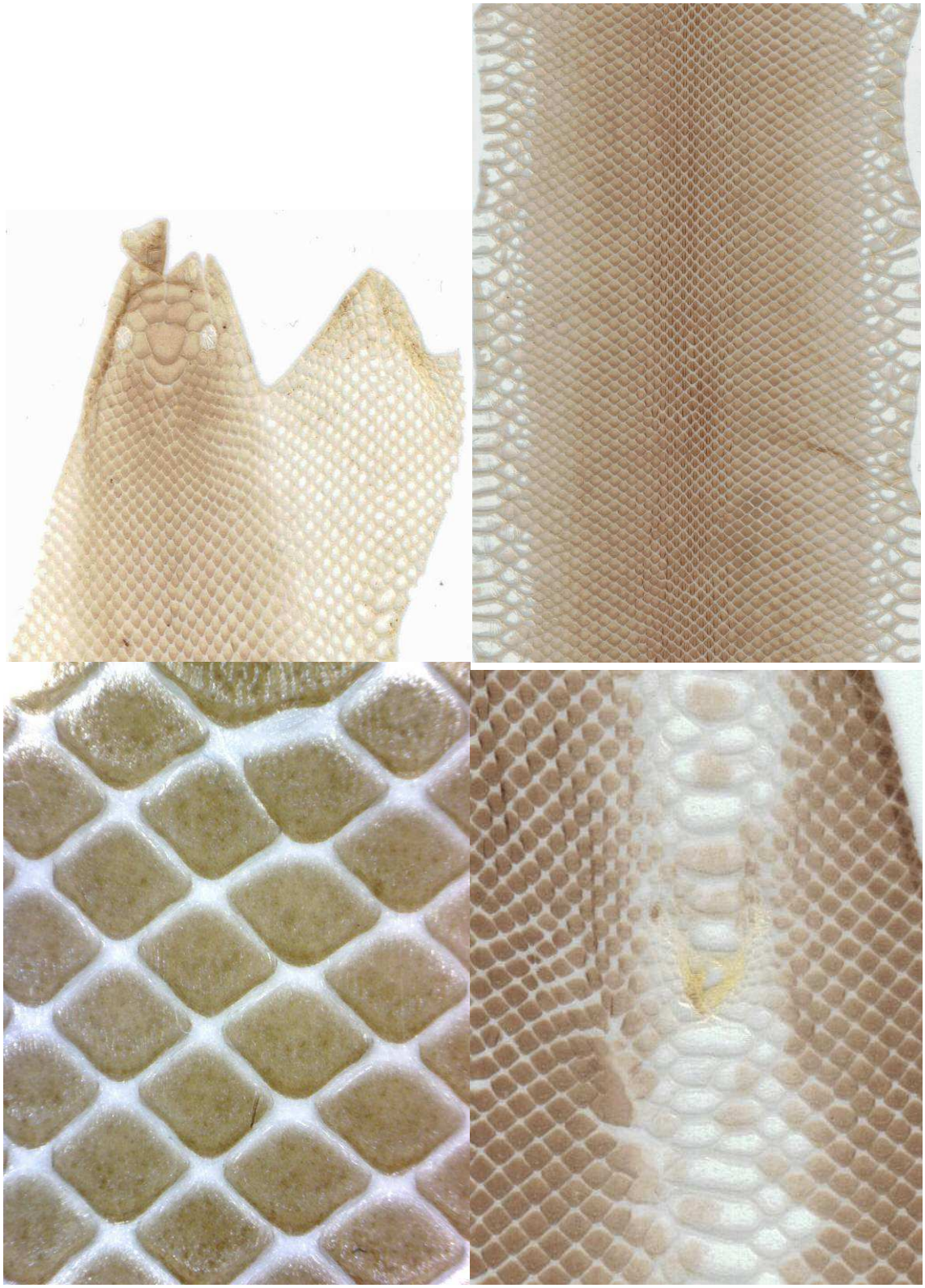
33a. Dorsal blotches with alternating lateral blotches; DSR 23-25…….. **Eastern Foxsnake, *Mintonius gloydi**** (pg. 60)

33b. Dorsal surface of shed skin heavily pigmented, median scale rows darkest; DSR 25-27……**Midland Ratsnake, *Scotophis spiloides**** (pg. 62)

Species Accounts

The following species accounts are meant to confirm identifications made with the preceding key. Each account contains descriptions of scalation, pattern, and a summary of the species geographic distribution in Canada. Also included, for most species, is a plate containing images of actual shed skins. These images include a head section, midbody section, magnified dorsal scales, and a tail/vent section. A list of references used in the preparation of each account is also given.

PLATE 3. Northern Rubber Boa, *Charina bottae*



Northern Rubber Boa, *Charina bottae* (Plate 3)

Scalation: There are usually three scales, two supraoculars and a frontal, between the spectacles; parietal and temporal regions with numerous small scales; 1 preocular; 3-4 postoculars; 9-11 supralabials; infralabials 10-11; chin shields reduced; dorsal scales are smooth, lack apical pits, and occur in 32-53 rows at midbody; the 182-231 ventral scales are reduced; anal plate entire; the 24-43 subcaudals are entire; the tail is blunt and capped with large plates. Small spurs may be visible on either side of the anal plate, especially in males.

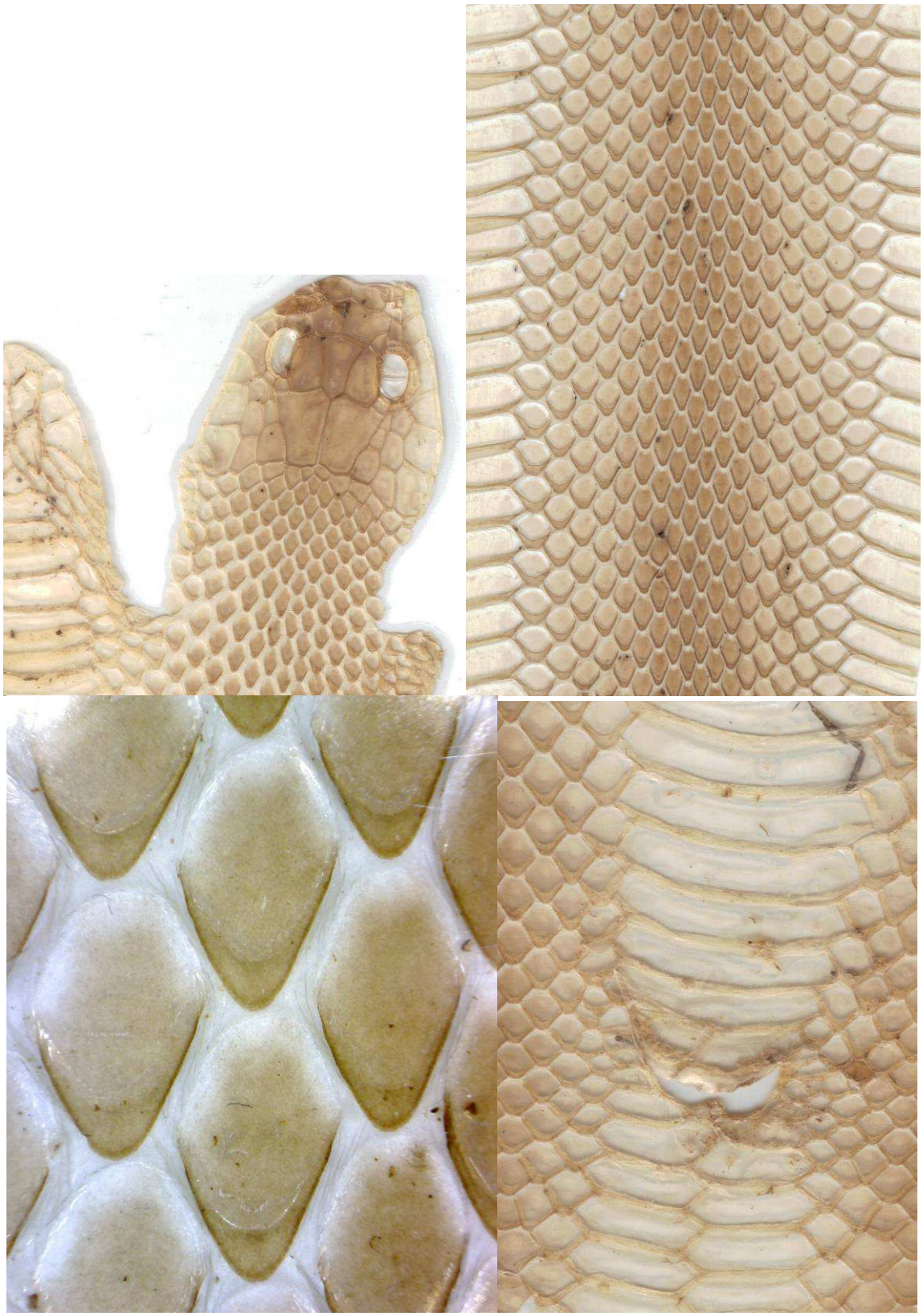
Pigmentation: Sheds are uniformly pigmented dorsally, gradually darkening from DSR 6-9 to the vertebral row; lowermost dorsal scales (rows 1-3) are usually not pigmented. The ventrals and subcaudals usually lack pigment, however, in rare instances there may be irregular, well-separated spots of pigment on these scales.

Geographic distribution: Southern British Columbia, as far north as Quesnel (Seburn and Brooks 2007); possibly occurs in Alberta between the Crow's Nest Pass and Waterton (Russell and Bauer 1993).

References: Nussbaum et al. 1983; Russell and Bauer 1993; Ernst and Ernst 2003; Matsuda et al. 2006; Seburn and Brooks 2007.

Explanation of Plate 3: Upper left: Head section of *C. bottae*. Upper right: midbody section of *C. bottae* shed skin. Lower left: Magnified dorsal scales of C. bottae. Lower right: Ventral scales, anal plate and subcaudals of *C. bottae*.

PLATE 4. Eastern Racer, *Coluber constrictor*



Eastern Racer, *Coluber constrictor* (Plate 4)

Scalation: Scales on head normal; preoculars 2, lower one greatly reduced; post oculars 2; temporals 2+2; supralabials usually 7, with four posterior supralabials, second POSL being much narrower at top than at base; infralabials 8; posterior chin shields equal to or longer than anterior pair; dorsal scales smooth, with paired apical pits, rows at midbody 17; ventral scales 151-193; anal plate divided; subcaudals paired and usually less than 85.

Pigmentation: Shed skins have a uniform pattern, pigmented from edge of ventrals, darkest from DSR 5 and 6 to vertebral row.

Distribution: Pelee Island, Ontario and south-central Saskatchewan; formerly southern Ontario.

References: Logier 1958; Powell et al. 1998; Seburn and Brooks 2007.

Explanation of Plate 4: Upper left: head section of *C. constrictor* shed skin. Upper right: Midbody section of *C. constrictor* shed skin. Lower left: magnified dorsal scales of *C. constrictor*. Lower right: ventrals, anal plate, and subcaudals of *C. constrictor*.

Western Racer, *C. mormon*

(see Plate 4, *C. constrictor*)

Western Racer, *C. mormon* (see Plate 4, *C. constrictor*)

Scalation: Scales on head normal; preoculars 2, lower one greatly reduced; post oculars 2; temporals 2+2; supralabials usually 8, with four posterior supralabials, second POSL much narrower at top than at base; infralabials 9; posterior chin shields equal to or longer than anterior pair; dorsal scales smooth, with paired apical pits, rows at midbody 17; ventral scales 158-191; anal plate divided; subcaudals paired and usually more than 85.

Pigmentation: Shed skins similar to those of the Eastern Racer, and have a uniform pattern, pigmented from edge of ventrals, darkest from DSR 5 and 6 to vertebral row.

Distribution: In British Columbia, the area bounded by the Okanagan Valley and the Similkameen, Fraser and Thompson River Valleys (Matsuda et al. 2006).

References: Nussbaum et al. 1983; Powell et al. 1998; Ernst and Ernst 2003; Matsuda et al. 2006; Seburn and Brooks 2007.

Explanation of Plate: This species and the previous one are very similar and best differentiated by geographic distribution (See plate 4, *C. constrictor*).

PLATE 5. Sharptail Snake, *Contia tenuis*

Sharptail Snake, *Contia tenuis* (Plate 5)

Scalation: Head scales normal, one preocular; postoculars 2; temporals 1+1 or 1+2; supralabials 7, with 4 POSL; infralabials 7; anterior chin shields longer than posterior pair; dorsal scales are smooth with single apical pit, 15 DSR at midbody; ventrals 147-186; anal plate divided; the 27-57 subcaudals are paired.

Pigmentation: Shed skins are uniformly patterned, DSR 1 with very little or no pigment, pigment gradually becomes darker, DSR 4 to vertebral row darker than those below.

Distribution: On Vancouver Island and four of the Gulf Islands, British Columbia (Matsuda et al. 2006; Seburn and Brooks 2007).

References: Nussbaum et al. 1983; Matsuda et al. 2006; Seburn and Brooks 2007.

Explanation of Plate 5: Upper left: head section of *C. tenuis* shed skin. Upper right: Midbody section of *C. tenuis* shed skin. Lower left: Magnified dorsal scales of *C. tenuis* shed skin. Lower right: ventrals, anal plate, and subcaudals of *C. tenuis* shed skin.

PLATE 6. Ringneck Snake, *Diadophis punctatus*

Ringneck Snake, *Diadophis punctatus* (Plate 6)

Scalation: Head scales normal; preoculars 2; postoculars 2; temporals 1+1; supralabials 8, four POSL; infralabials 8; posterior chin shields equal to or shorter than anterior pair; dorsal scales smooth with a single apical pit, DSR 15 at midbody; ventrals 139-176; anal plate divided; 41-65 divided subcaudals.

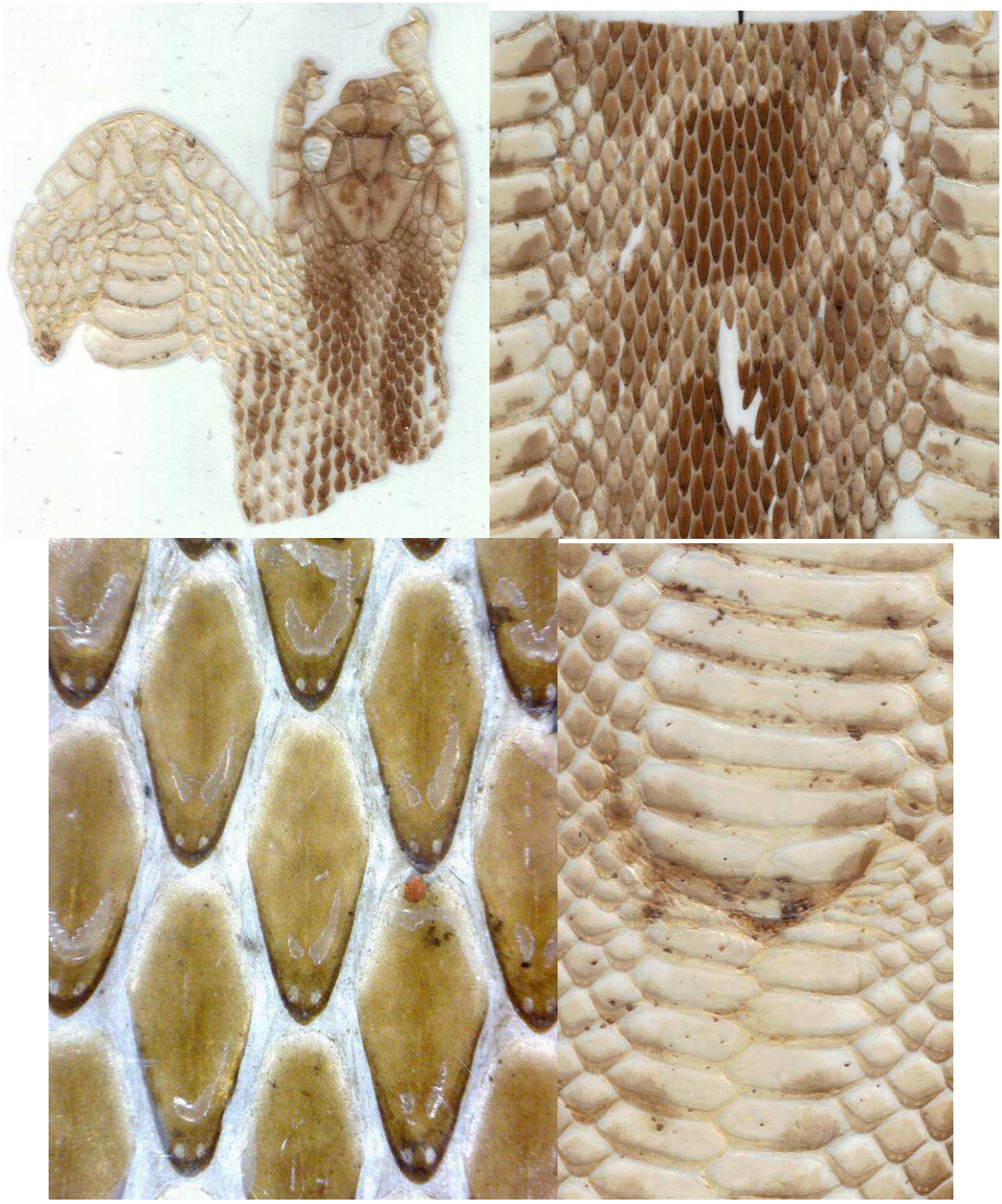
Pigmentation: shed skins have a uniform pattern on body, lower scales lightly pigmented, DSR 3 to vertebral row darker than those below; a light collar present 1-2 scales behind parietals.

Distribution: Southern Ontario, Quebec, New Brunswick and Nova Scotia.

References: Blanchard 1942; Logier 1958; Ernst and Ernst 2003.

Explanation of Plate 6: Upper left: Head section of *D. punctatus* shed skin. Upper right: Midbody section of *D. punctatus* shed skin. Lower left: magnified dorsal scales. Lower right: ventrals, anal plate, and subcaudals of *D. punctatus* shed skin.

PLATE 7. Eastern Foxsnake, *Mintonius gloydi*



Eastern Foxsnake, *Mintonius gloydi* (Plate 7)

Scalation: Head scales normal, 1 preocular; post oculars 2; temporals 2+3 or 3+3; supralabials 8, POSL 4; infralabials 10-12; posterior chin shields equal to or shorter than anterior pair; first three to five dorsal scale rows smooth, above these to vertebral row keeled, with paired apical pits, 23-25 rows at midbody; 190-218 ventrals; anal plate divided; 45-71 divided subcaudals.

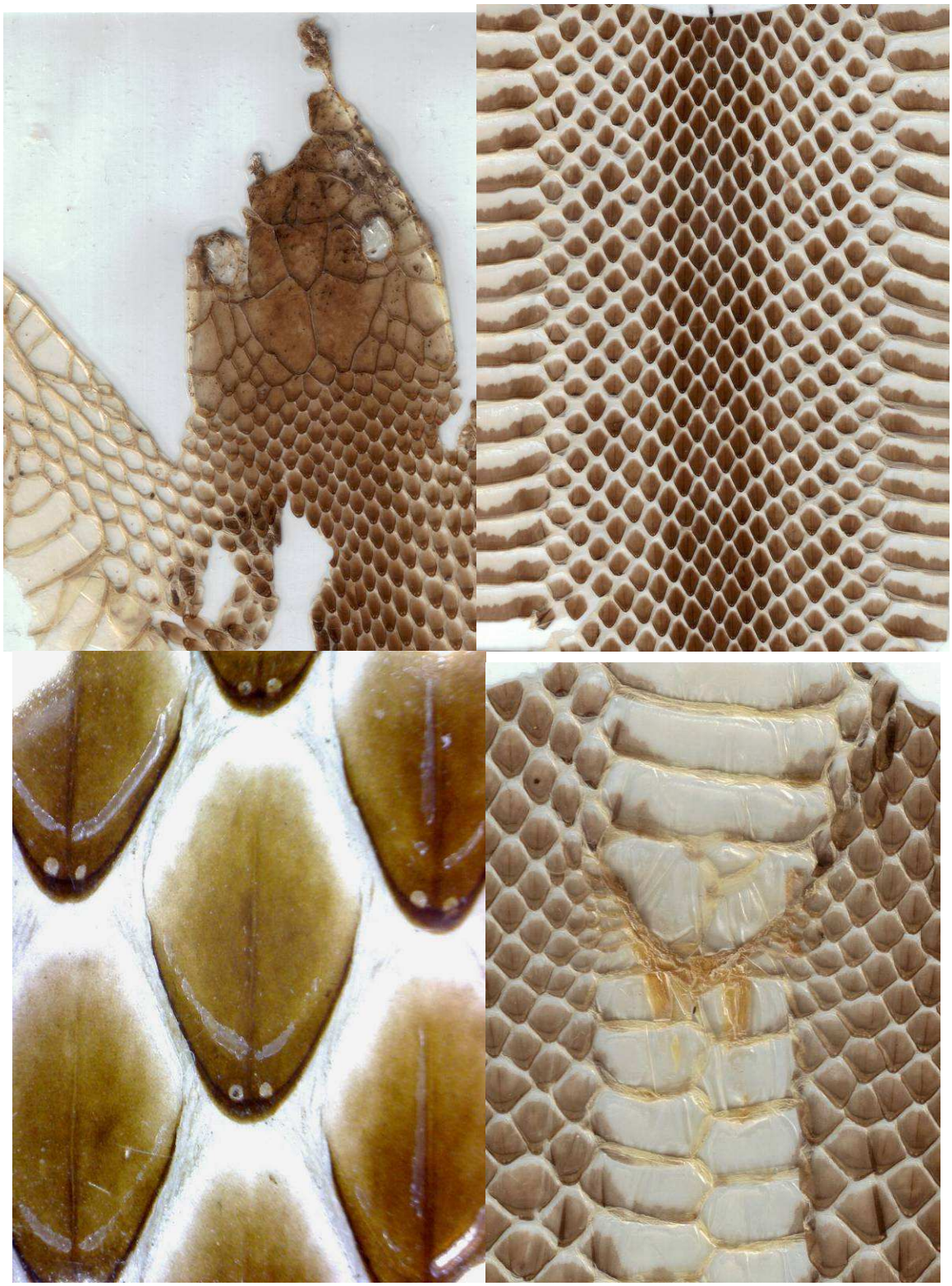
Pigmentation: Conspicuous pattern on head scales, dark pigment extends between spectacles on prefrontal, frontal and supraoculars; on the body are 28-43 dorsal blotches, with two alternating and smaller lateral blotches extend onto ventrals; 9-16 tail bands.

Distribution: In Ontario, along the Lake Erie-Lake Huron shoreline and Lake Erie Islands, Detroit River, Lake St. Clair, and Georgian Bay.

References: Logier 1958; Schulz 1996; Seburn and Brooks 2007.

Explanation of Plate 7: Upper left: head section of *M. gloydi* shed skin. Upper right: midbody section of *M. gloydi*. Lower left: magnified dorsal scales of *M. gloydi* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *M. gloydi* shed skin.

PLATE 8. Midland Ratsnake, *Scotophis spiloides*



Midland Ratsnake, *Scotophis spiloides* (Plate 8)

Scalation: Head scales normal, 1 preocular; postoculars 2; temporals 2+3 or 2+4; supralabials 8, POSL 4; infralabials 10-13; posterior chin shields equal to or shorter than anterior pair; first few scale rows smooth, above these and including vertebral row keeled, with paired apical pits, 25-27 rows at midbody; 222-246 ventrals; anal plate divided; 63-90 paired subcaudals.

Pigmentation: Head uniformly pigmented; on the body, all dorsal scale rows pigmented, but darkest from DSR 9 to vertebral row, forming a dark band. Ventrals usually extensively pigmented, especially on the posterior edge and sides.

Distribution: In Ontario, the Carolinian forest region north of Lake Erie, and the Frontenac Axis region.

References: Logier 1958; Schulz 1996; Seburn and Brooks 2007.

Explanation of Plate 8: Upper left: head section of *S. spiloides* shed skin. Upper right: midbody section of *S. spiloides*. Lower left: magnified dorsal scales of *S. spiloides* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *S. spiloides* shed skin.

PLATE 9. Western Hognose Snake, *Heterodon nasicus*

Western Hognose Snake, *Heterodon nasicus* (Plate 9)

Scalation: There are 2-28 azygous scales between the internasal and prefrontal scales; an ocular ring of 7-13 scales border spectacles; temporals (2-5)+(3-7); supralabials 8, POSL 4; infralabials 10-11; posterior chin shields shorter than anterior pair; lowermost 1-2 scale rows smooth, above these to vertebral row keeled, dorsal scales lack an apical notch, with paired apical pits, and occur in 23 rows at midbody; 125-156 ventrals; anal plate divided; 26-50 divided subcaudals.

Pigmentation: Conspicuous pattern on head scales, dark transverse bar between spectacles; another transverse bar crosses the frontal and supraoculars behind spectacle to the angle of the mouth. There are 23-32 dark pigmented dorsal blotches, with two smaller alternating lateral rows of blotches; 8-19 tail bands.

Distribution: Southeast Alberta, southwest Saskatchewan, and extreme southwest Manitoba.

References: Preston 1982; Russell and Bauer 1993; Ernst and Ernst 2003. Seburn and Brooks 2007.

Explanation of Plate 9: Upper left: head section of *H. nasicus* shed skin. Upper right: midbody section of *H. nasicus*. Lower left: magnified dorsal scales of *H. nasicus* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *H. nasicus* shed skin.

PLATE 10. Eastern Hognose Snake, *Heterodon platirhinos*

Eastern Hognose Snake, *Heterodon platirhinos* (Plate 10)

Scalation: Usually 1-2 azygous scales between the internasal and prefrontals scales; an orbital ring of 8-13 scales around each spectacle; temporals (3-5) + (4-5); supralabials 8, POSL 4; infralabials 10-11; posterior chin shields shorter than anterior pair; dorsal scales keeled, lack an apical notch, with paired apical pits, and occur in 25 rows at midbody; 112-154 ventrals; anal plate divided; 30-64 divided subcaudals.

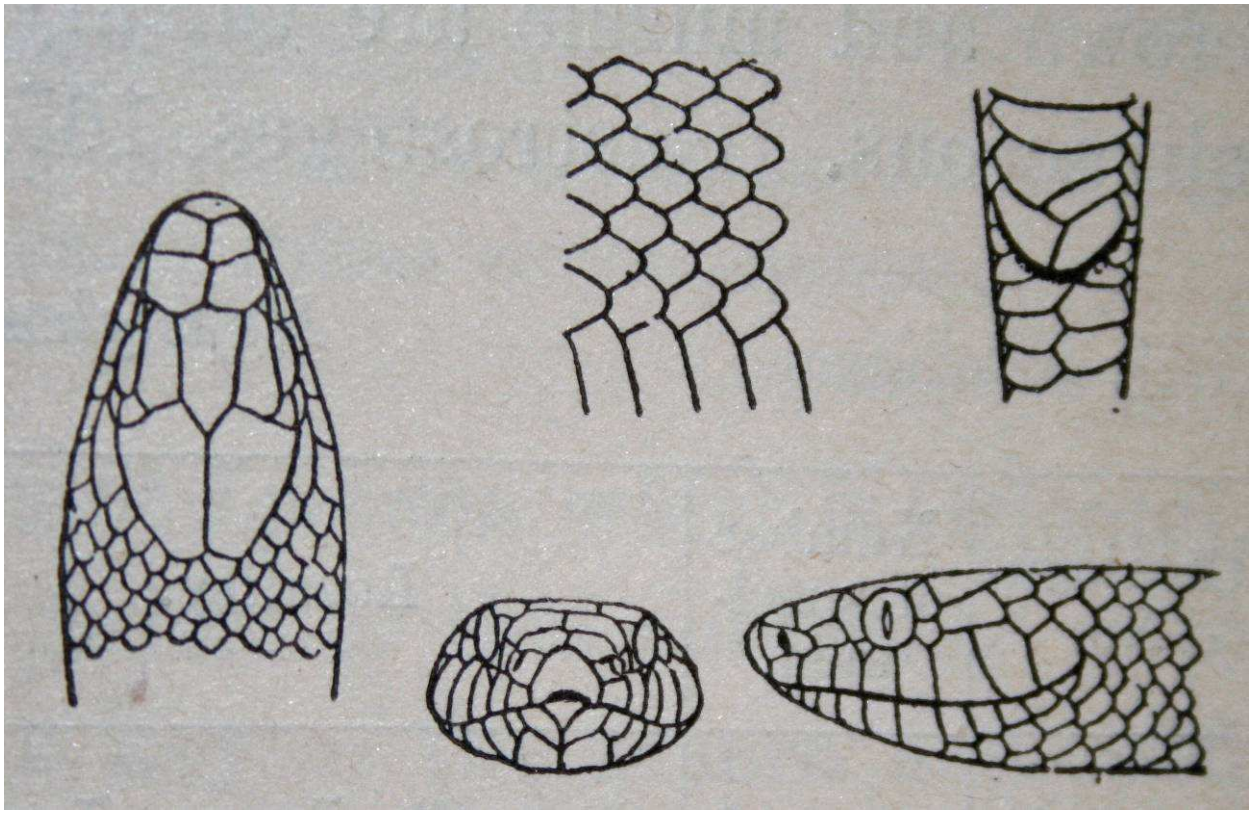
Pigmentation: Conspicuous pattern on head scales, A dark V-shaped mark, with the apex on the parietal scales occurs behind the spectacles, and a transverse dark bar lies between the spectacles and extends downward to the angle of the mouth (Ernst and Ernst 2003); on the body are 17-31 uniformly pigmented dorsal blotches, with smaller alternating lateral blotches6-14 dark tail bands.

Distribution: In Ontario, southern and central Ontario, south of Lake Nipissing, along Georgian Bay, with scattered records east of Georgian Bay to Peterborough (Seburn and Brooks 2007).

References: Logier 1958; Ernst and Ernst 2003; Seburn and Brooks 2007.

Explanation of Plate 10: Upper left: head section of *H. platirhinos* shed skin. Upper right: midbody section of *H. platirhinos*. Lower left: magnified dorsal scales of *H. platirhinos* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *H. platirhinos* shed skin.

PLATE 11. Desert Night Snake, *Hypsiglena chlorophaea*



Desert Night Snake, *Hypsiglena chlorophaea* (Plate 11)

Scalation: Head scales normal, preocular 2, with the lower one reduced; post oculars 2; temporals 1+2; supralabials 8, POSL 4; infralabials 10; posterior chin shields approximately equal to anterior pair; dorsal scales smooth, with single apical pit, DSR 21 at midbody; 177-204 ventrals; anal plate divided; 44-66 divided subcaudals. Wright and Wright (1957) report that in males, there are spines present on dorsal scales above the anal plate. It is not certain whether these could be visible on a shed skin.

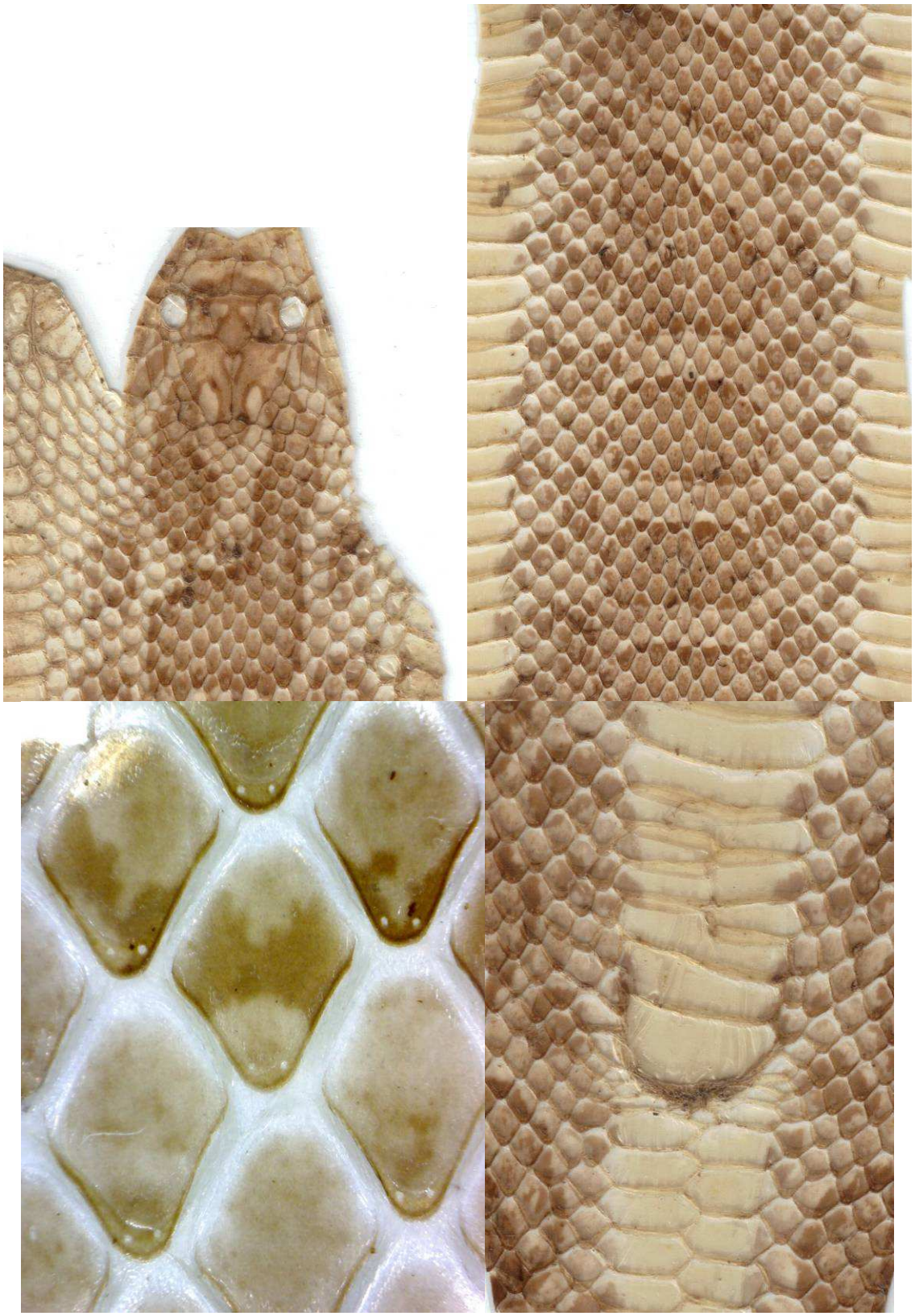
Pigmentation: Shed skins may have a dark elongated blotch extending from behind the spectacle onto the side of the nape; on the body 50-70 irregularly shaped blotches on the dorsum, with smaller, less pigmented blotches on the sides.

Distribution: In British Columbia, southern Okanagan and Similkameen River valleys.

References: Nussbaum et al. 1983; Ernst and Ernst 2003; Matsuda et al. 2006.

Explanation of Plate 11: Illustration from Cope (1900) of *Hypsiglena ochrorhyncha* (now *H. chlorophaea*).

PLATE 12. Milk Snake, *Lampropeltis triangulum*



Milk Snake, *Lampropeltis triangulum* (Plate 12)

Scalation: Head scales normal, 1 preocular; post oculars 2; temporals 2+(2-3); supralabials 7, POSL 4; infralabials 9; posterior chin shields shorter than anterior pair; dorsal scales smooth, with two apical pits, DSR 21 at midbody; 182-214 ventrals; anal plate entire; 35-54 divided subcaudals.

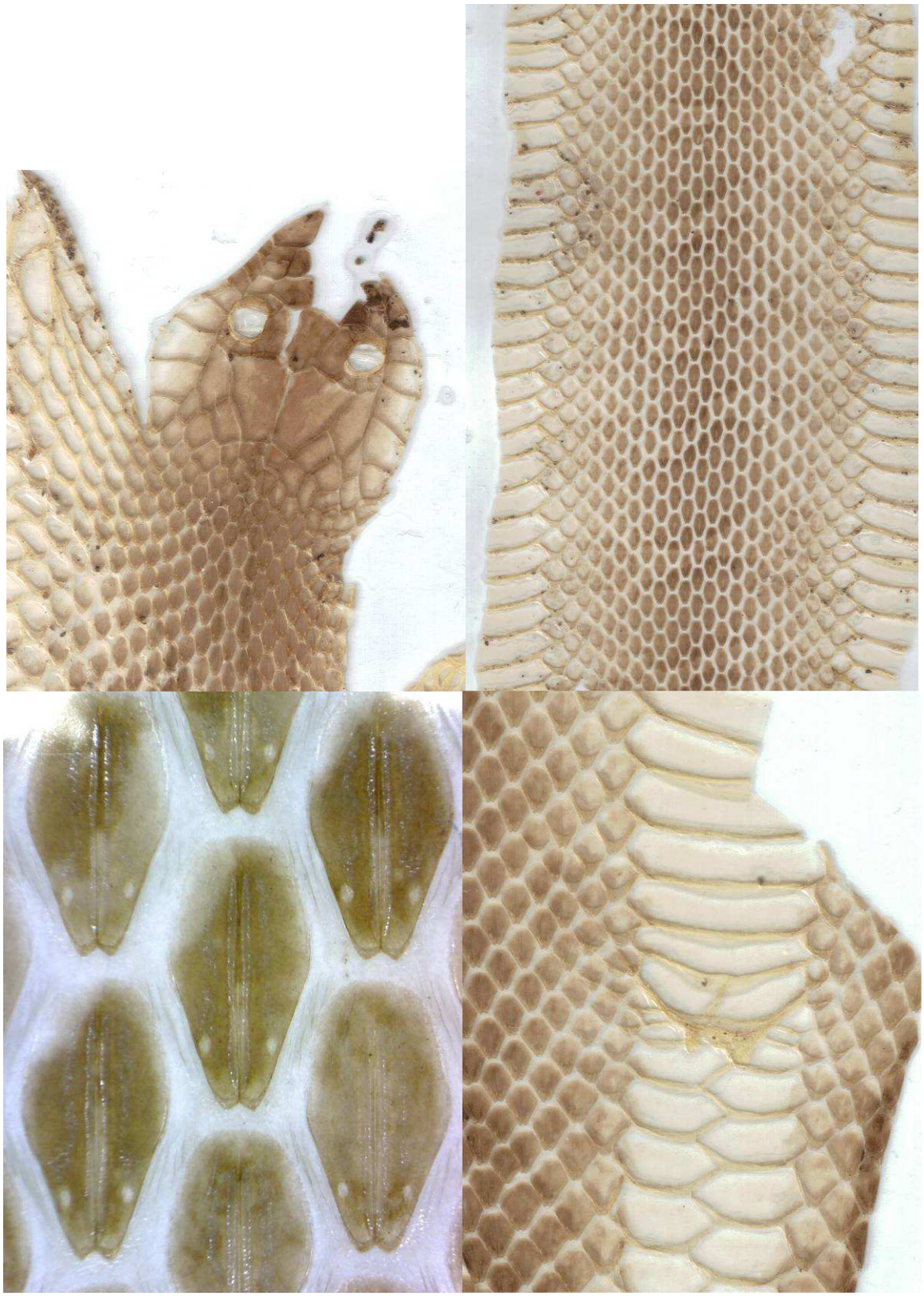
Pigmentation: A pigmented "Y" or "U" on head, dark stripe extends from spectacle to angle of the mouth; 26-54 dark bordered blotches on body extend to DSR 4 or 5; smaller alternating blotches on the sides.

Distribution: Southwestern Quebec as far east as Yamaska; southern and central Ontario as far north as Lake Nipissing and Sault Ste. Marie (Seburn and Brooks 2007).

References: Logier 1958; Williams 1978; Seburn and Brooks 2007.

Explanation of Plate 12: Upper left: head section of *L. triangulum* shed skin. Upper right: midbody section of *L. triangulum*. Lower left: magnified dorsal scales of *L. triangulum* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *L. triangulum* shed skin.

PLATE 13. Northern Water Snake, *Nerodia sipedon*



Northern Water Snake, *Nerodia sipedon* (Plate 13)

Scalation: Head scales normal, 1 preocular; post oculars 2-3; temporals 1+(2-3); supralabials 8, POSL 4; infralabials 10, but may be 9-12; posterior chin shields longer than anterior pair; dorsal scales keeled, with an apical notch, with two apical pits, DSR 21-25 at midbody; 127-149 ventrals; anal plate divided; 42-84 divided subcaudals.

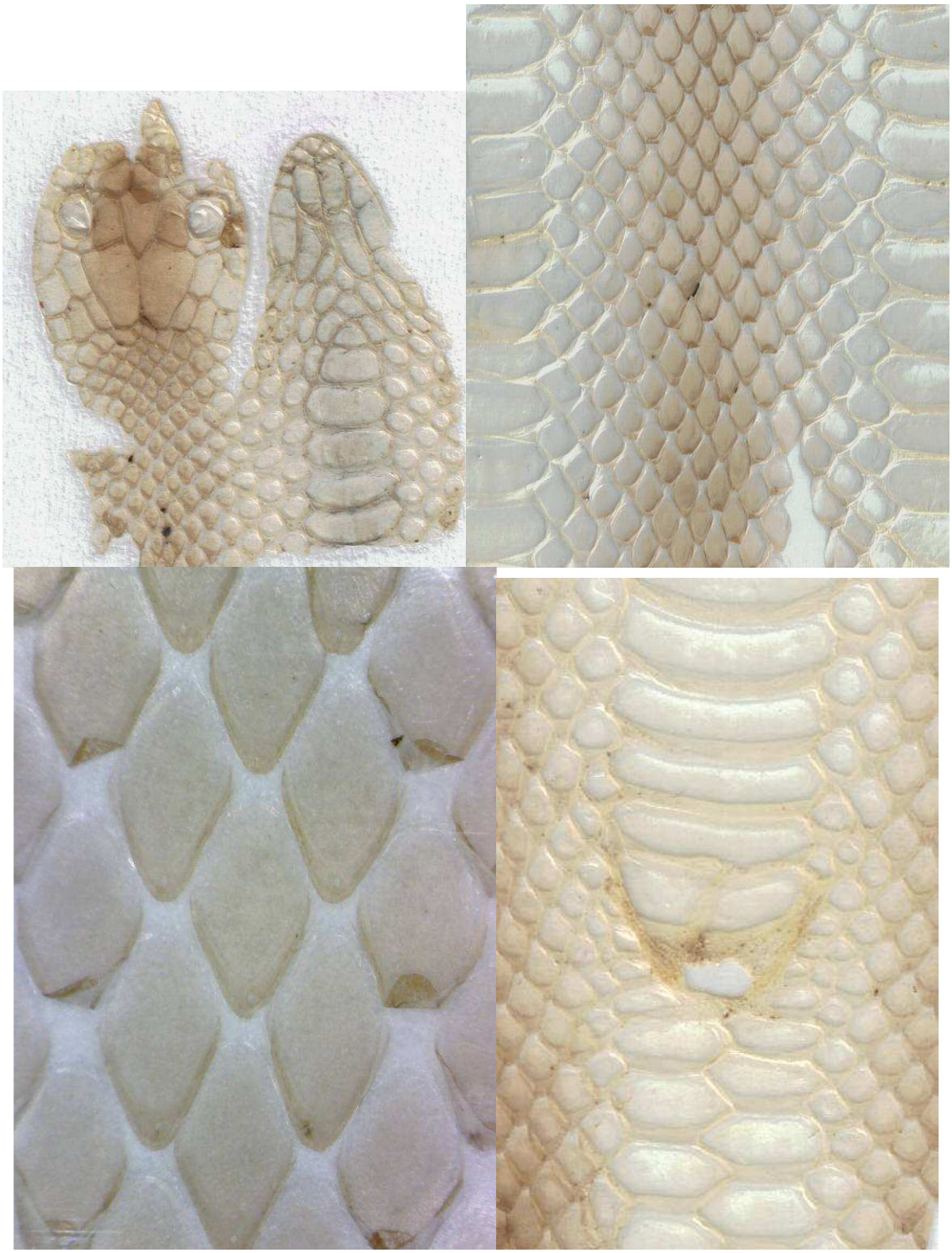
Pigmentation: Crown of head usually uniformly pigmented; on the body, dark crossbands anteriorly, becoming blotched posteriorly. *Nerodia s. insularum* may have a uniform pattern on the body.

Distribution: *Nerodia s. sipedon* is found in southern Ontario and southern Quebec. *Nerodia s. insularum* occurs on Middle Island, Hen Island, East Sister Island and Pelee Island, Ontario.

References: Logier 1958; Gibbons and Dorcas 2004; Seburn and Brooks 2007.

Explanation of Plate 13: Upper left: head section of *N. sipedon* shed skin. Upper right: midbody section of *N. sipedon*. Lower left: magnified dorsal scales of *N. sipedon* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *N. sipedon* shed skin.

PLATE 14. Smooth Green Snake, *Liochlorophis vernalis*



Smooth Green Snake, *Liochlorophis vernalis* (Plate 14)

Scalation: Head scales normal, 1 preocular; post oculars 2; temporals 1+2; supralabials 7, POSL 4; 7-8 infralabials; posterior chin shields longer than anterior pair; dorsal scales smooth, with an indistinct single apical pit, DSR 15 at midbody; 106-154 ventrals; anal plate divided; 59-102 divided subcaudals.

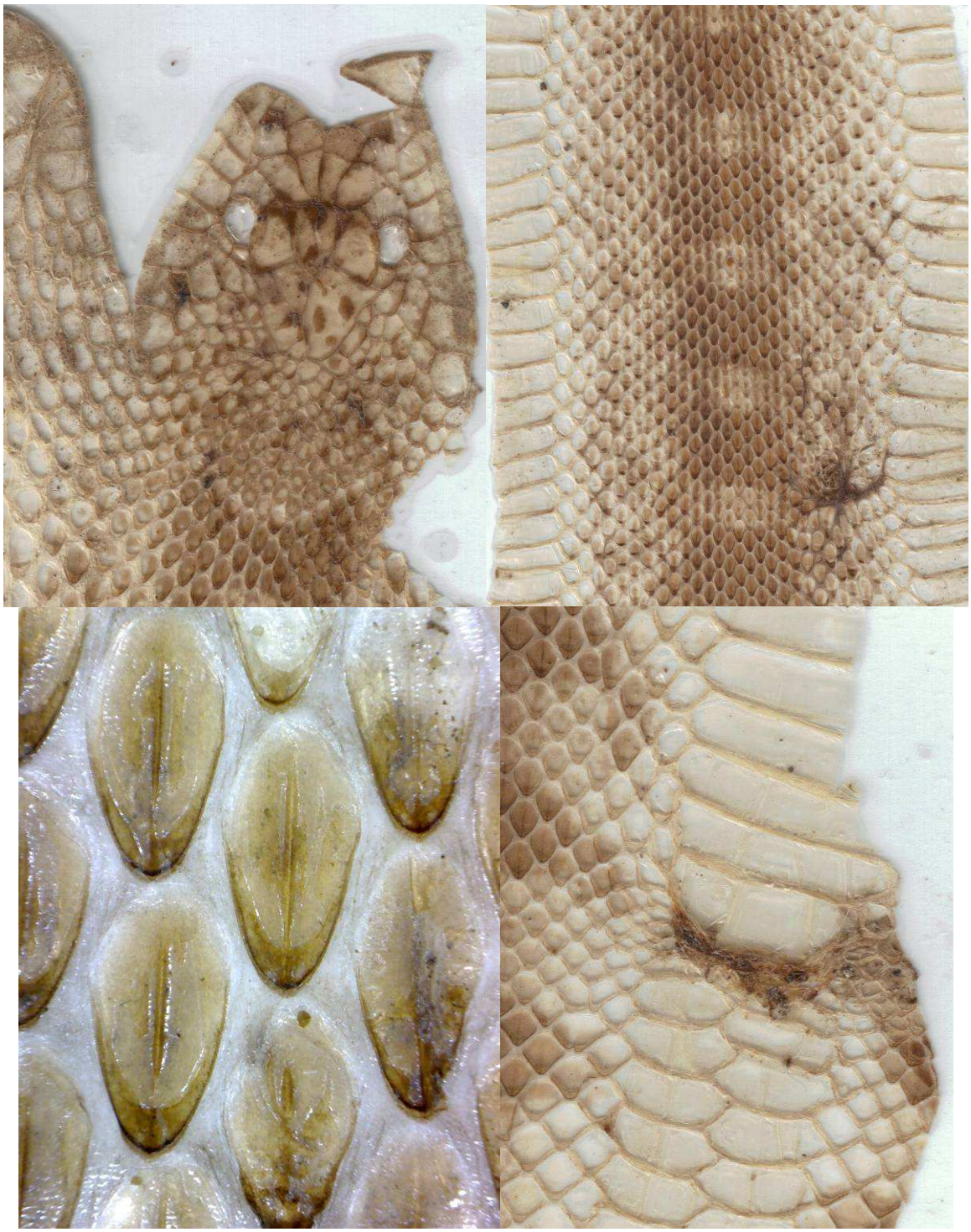
Pigmentation: Crown of head usually uniformly pigmented; on the body, the lowermost rows (DSR 1 and 2) are non-pigmented, scale rows above these pigmented and darker.

Distribution: Prince Edward Island, Nova Scotia and New Brunswick, west into southern Québec, southern Ontario, southern Manitoba and south-central Saskatchewan.

References: Logier 1958; Preston 1982; Ernst and Ernst 2003; Seburn and Brooks 2007.

Explanation of Plate 14: Upper left: head section of *L. vernalis* shed skin. Upper right: midbody section of *L. vernalis*. Lower left: magnified dorsal scales of *L. vernalis* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *L. vernalis* shed skin.

PLATE 15. Gopher Snake, *Pituophis catenifer*



Gopher Snake, *Pituophis catenifer* (Plate 15)

Scalation: There are four prefrontal scales; 1-2 preoculars; 3-4 post oculars; temporals 1+(2-3); 8-9 supralabials, POSL 4 or 5; 12-13 infralabials; posterior chin shields smaller than anterior pair; lowermost dorsal scales smooth, keeled above these, lack an apical notch, with paired apical pits, DSR 27-35 at midbody; 207-260 ventrals; anal plate entire; 48-84 divided subcaudals.

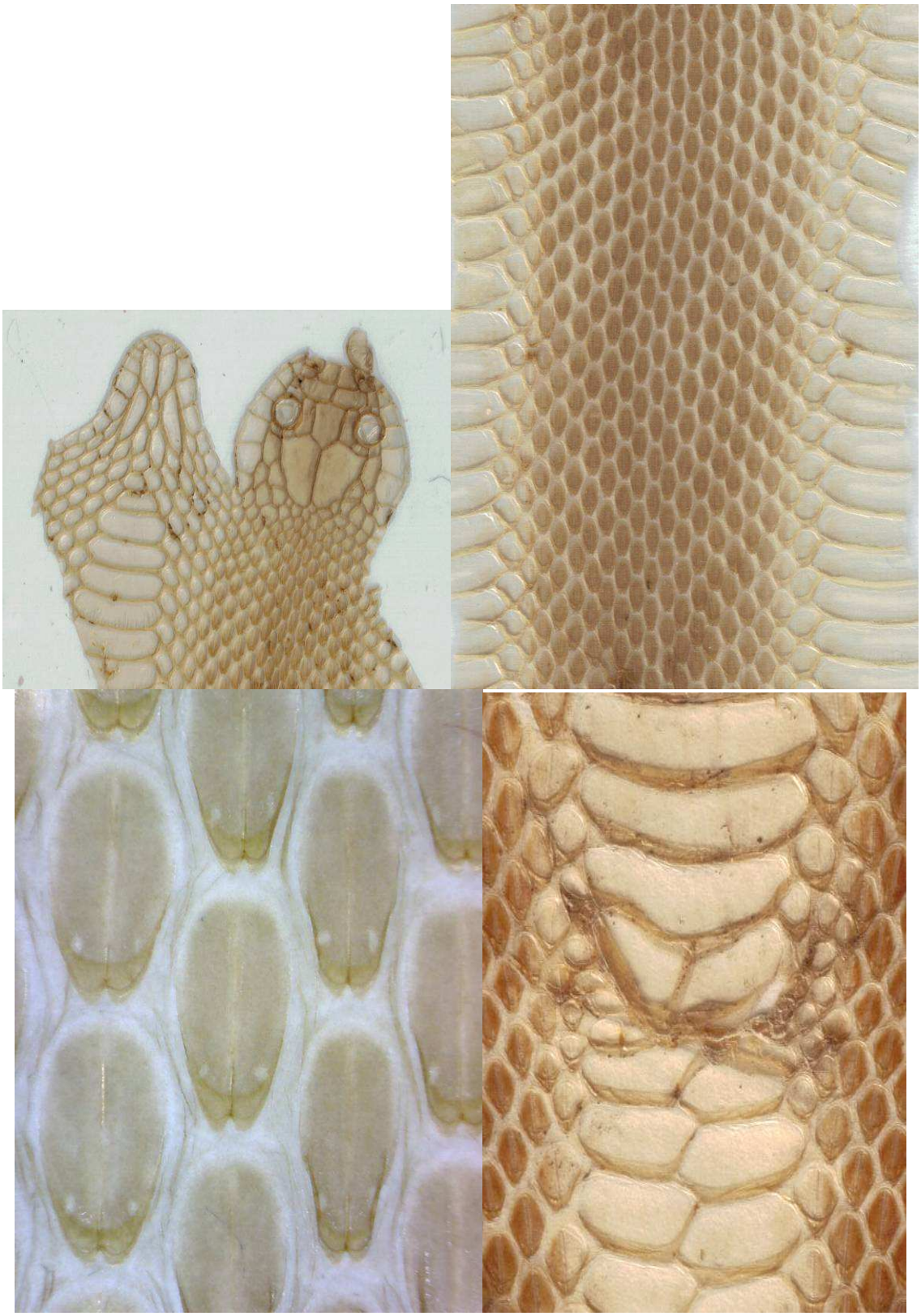
Pigmentation: Crown of head with small blotches of pigment; on the body, 33-71 dark dorsal blotches, smaller and alternating lateral blotches may be visible on shed skin; there are 6-22 dark crossbands on the tail.

Distribution: Okanagan and Thompson River valleys, British Columbia, southern Alberta and southwestern Saskatchewan.

References: Nussbaum et al. 1983; Russell and Bauer 1993; Ernst and Ernst 2003; Matsuda et al. 2006; Seburn and Brooks 2007.

Explanation of Plate 15: Upper left: head section of *P. catenifer* shed skin. Upper right: midbody section of *P. catenifer*. Lower left: magnified dorsal scales of *P. catenifer* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *P. catenifer* shed skin.

PLATE 16. Queen Snake, *Regina septemvittata*



Queen Snake, *Regina septemvittata* (Plate 16)

Scalation: Head scales normal: 2 preoculars; post oculars 2; temporals 1+(2-3); supralabials 7, POSL 4; infralabials 9 or 10; posterior chin shields longer than anterior pair; dorsal scales keeled, with an apical notch, with paired apical pits, DSR 19 at midbody; 118-159 ventrals; anal plate divided; 47-89 divided subcaudals.

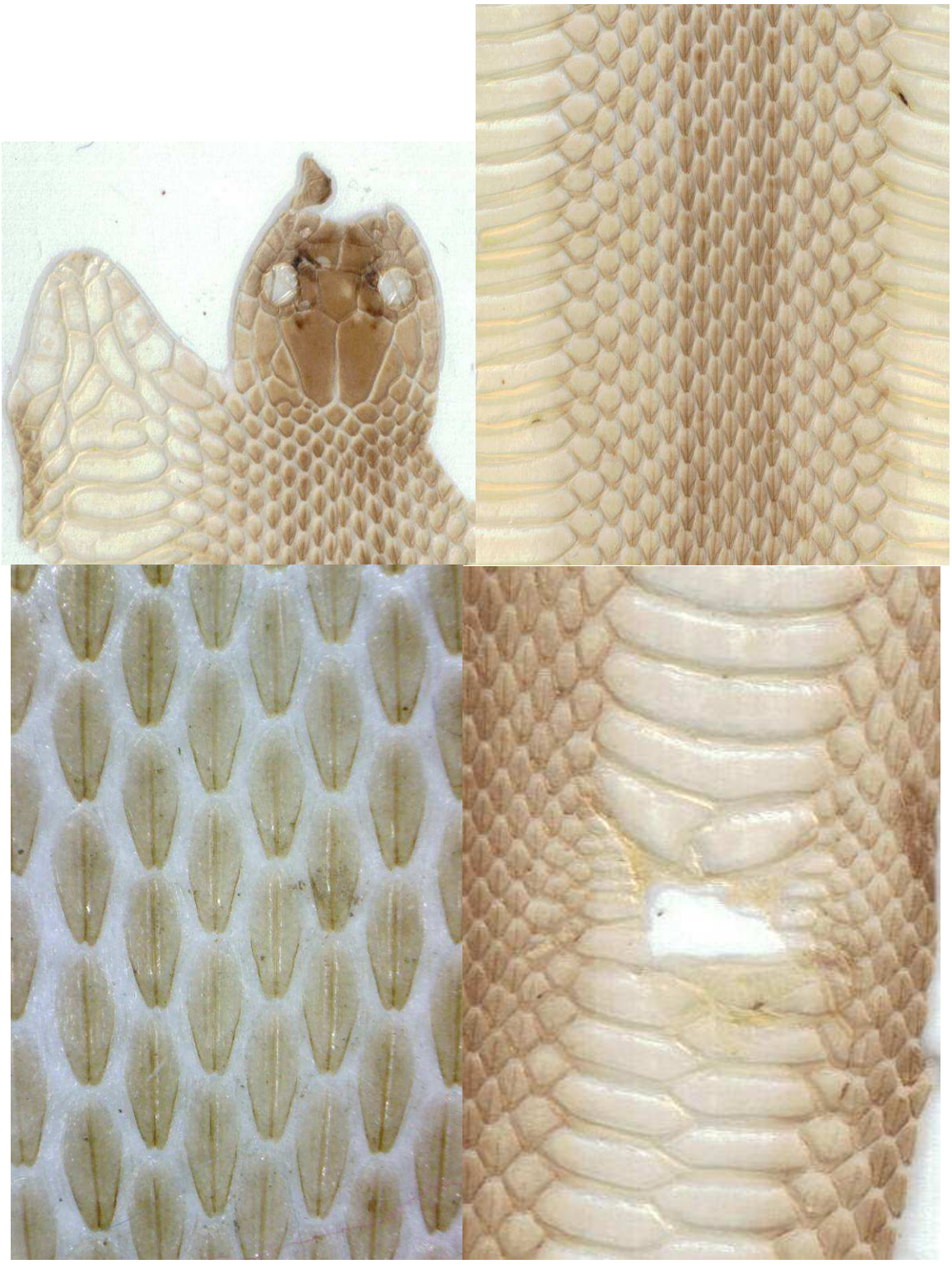
Pigmentation: Crown of head uniformly pigmented; on the body, DSR 1 and at least the lower half of 2 non-pigmented, above these uniformly pigmented.

Distribution: southwestern Ontario, west of the Niagara Escarpment and south of Georgian Bay (Seburn and Brooks 2007).

References: Logier 1958; Gibbons and Dorcas 2004; Seburn and Brooks 2007.

Explanation of Plate 16: Upper left: head section of *R. septemvittata* shed skin. Upper right: midbody section of *R. septemvittata*. Lower left: magnified dorsal scales of *R. septemvittata* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *R. septemvittata* shed skin.

PLATE 17. Brown Snake, *Storeria dekayi*



Brown Snake, *Storeria dekayi* (Plate 17)

Scalation: The loreal scale is lacking; 1 preocular; postoculars 2; temporals 1+2; supralabials 7, POSL 4; infralabials 7; posterior chin shields about the same length or slightly longer than anterior pair; dorsal scales keeled, with an apical notch; paired apical pits may be present on scales on the nape; DSR 17 at midbody; 112-149 ventrals; anal plate divided; 36-73 divided subcaudals.

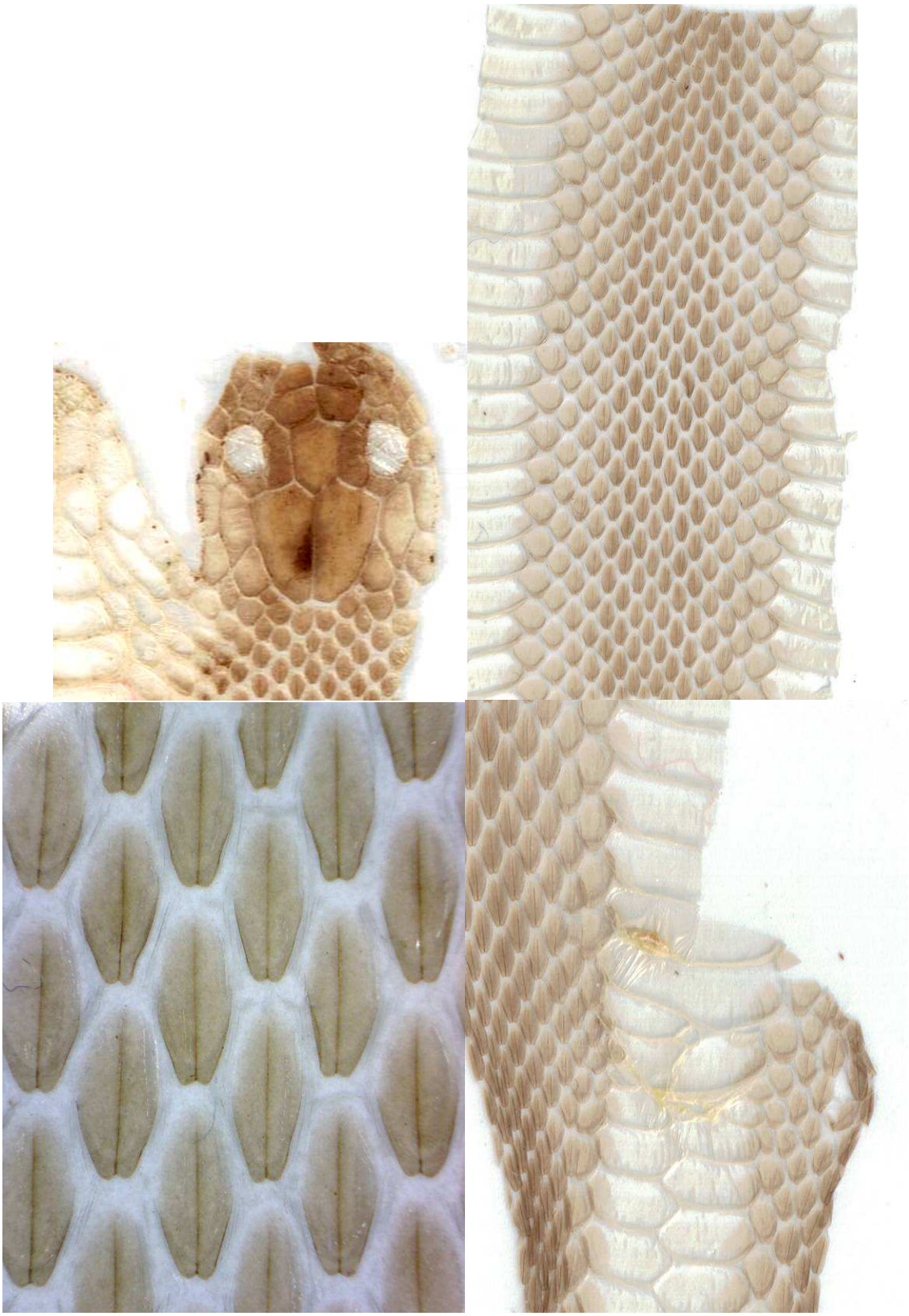
Pigmentation: Crown of head uniformly pigmented; a dark dorsolateral stripe on DSR 6 and 7, dark pigment between these stripes may create the impression of a single median dark stripe from DSR 6 to the vertebral row.

Distribution: southeastern Ontario and southern Québec.

References: Logier 1958; Ernst and Ernst 2003; Desroches and Rodrigue 2004; Seburn and Brooks 2007.

Explanation of Plate 17: Upper left: head section of *S. dekayi* shed skin. Upper right: midbody section of *S. dekayi*. Lower left: magnified dorsal scales of *S. dekayi* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *S. dekayi* shed skin.

PLATE 18. Redbelly Snake, *Storeria occipitomaculata*



Redbelly Snake, *Storeria occipitomaculata* (Plate 18)

Scalation: The loreal scale is lacking; 2 preoculars; postoculars 2; temporals 1+2; supralabials 6, POSL 3; infralabials 7; posterior chin shields about the same length or slightly longer than anterior pair; dorsal scales keeled, with an apical notch; paired apical pits may be present on scales on the nape; DSR 15 at midbody; 107-136 ventrals; anal plate divided; 34-63 divided subcaudals.

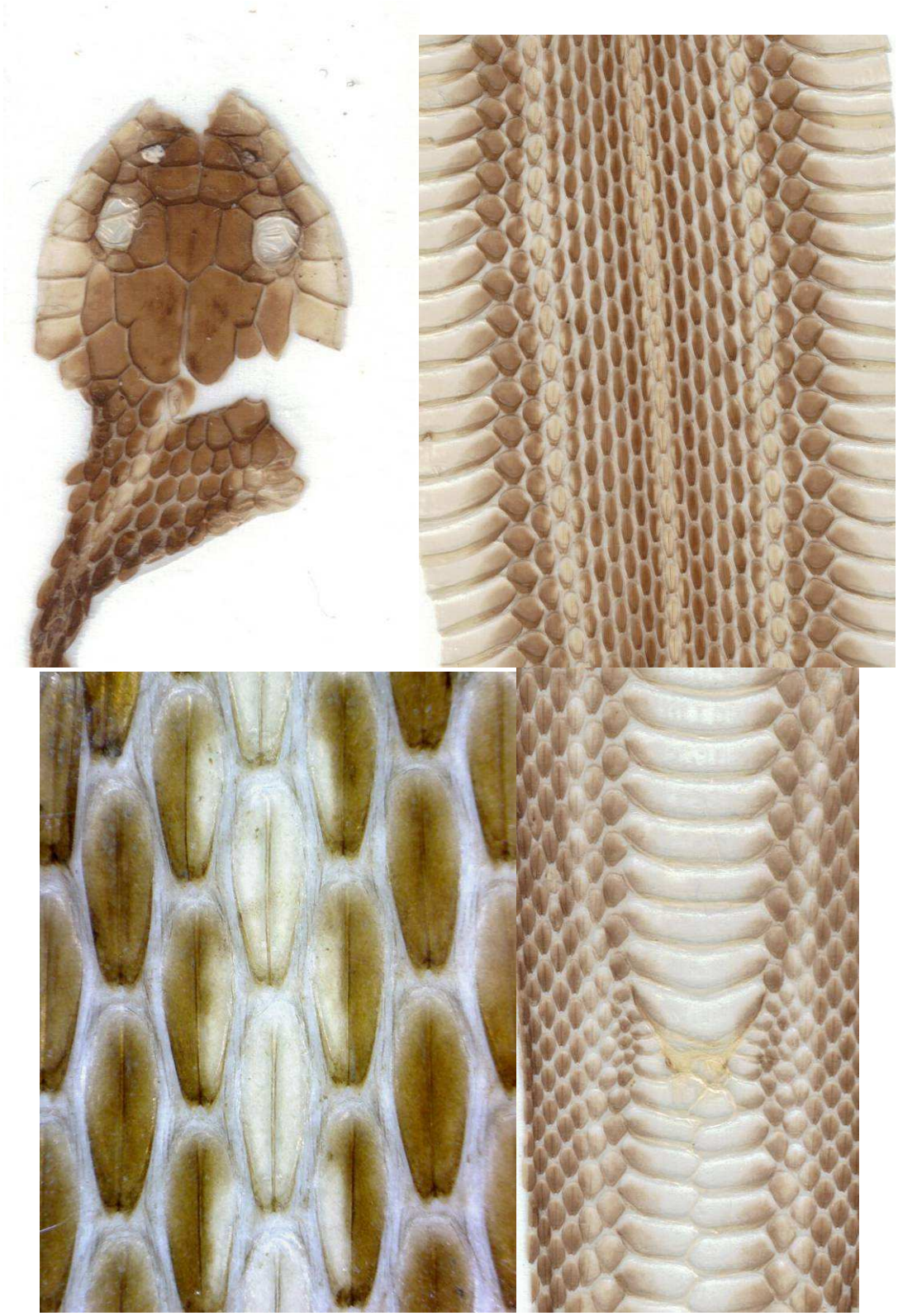
Pigmentation: Crown of head uniformly pigmented; a dark dorsolateral stripe on DSR 5 and 6, dark pigment between these stripes may create the impression of a single median dark stripe from DSR 5 to the vertebral row.

Distribution: southeastern Saskatchewan, east to Nova Scotia and Prince Edward Island.

References: Logier 1958; Preston 1982; Gilhen 1984; Ernst and Ernst 2003; Desroches and Rodrigue 2004; Seburn and Brooks 2007.

Explanation of Plate 18: Upper left: head section of *S. occipitomaculata* shed skin. Upper right: midbody section of *S. occipitomaculata*. Lower left: magnified dorsal scales of *S. occipitomaculata* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *S. occipitomaculata* shed skin.

PLATE 19. Butler's Garter Snake, *Thamnophis butleri*



Butler's Garter Snake, *Thamnophis butleri* (Plate 19)

Scalation: Head scales normal; 1 preocular; postoculars 2-3; temporals 1+(1-2); supralabials 6-7, POSL 4, but may be 3; infralabials 8-9; posterior chin shields about the same length or slightly longer than anterior pair; dorsal scales keeled, with an apical notch; apical pits usually not visible; DSR 19 at midbody; 129-154 ventrals; anal plate entire; 49-72 divided subcaudals.

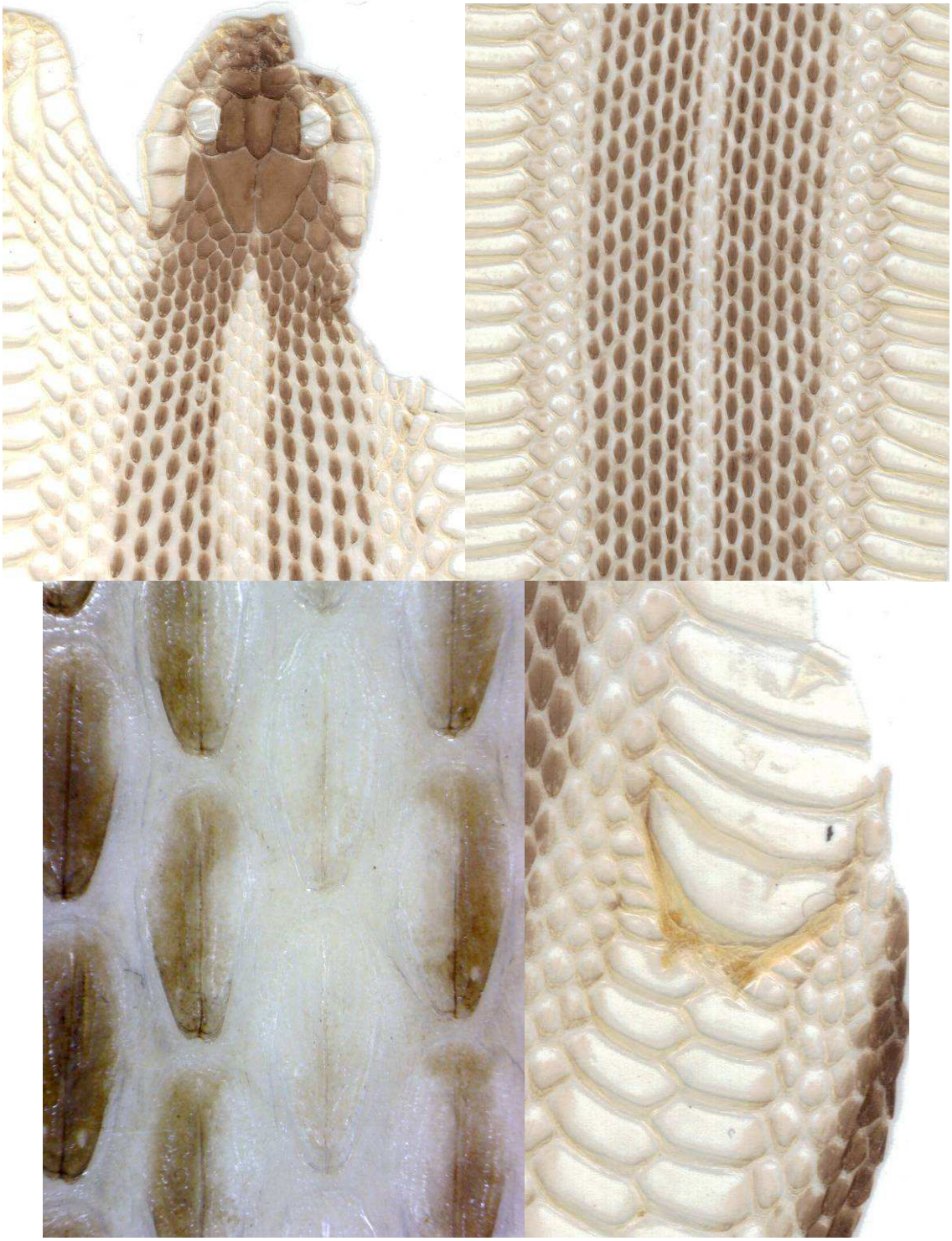
Pigmentation: Crown of head uniformly pigmented, light parietal spots present; light vertebral stripe, and lateral stripes on DSR 2-4; vertebral stripe does not extend onto parietals.

Distribution: extreme southern Ontario and the Luther Marsh area of central southern Ontario.

References: Logier 1958; Rossman et al. 1996; Ernst and Ernst 2003; Seburn and Brooks 2007.

Explanation of Plate 19: Upper left: head section of *T. butleri* shed skin. Upper right: midbody section of *T. butleri*. Lower left: magnified dorsal scales of *T. butleri* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *T. butleri* shed skin.

PLATE 20. Western Terrestrial Garter Snake, *Thamnophis elegans*



Western Terrestrial Garter Snake, *Thamnophis elegans* (Plate 20)

Scalation: Head scales normal; 1 preocular, may be two east of the Coastal Range; postoculars 3; temporals 1+(1-2) or 1+3; supralabials 8, occasionally 7; POSL 4; infralabials 10; posterior chin shields about the same length or slightly longer than anterior pair; dorsal scales keeled, with an apical notch; paired apical pits; DSR 21 at midbody; 137-185 ventrals; anal plate entire; 64-101 divided subcaudals.

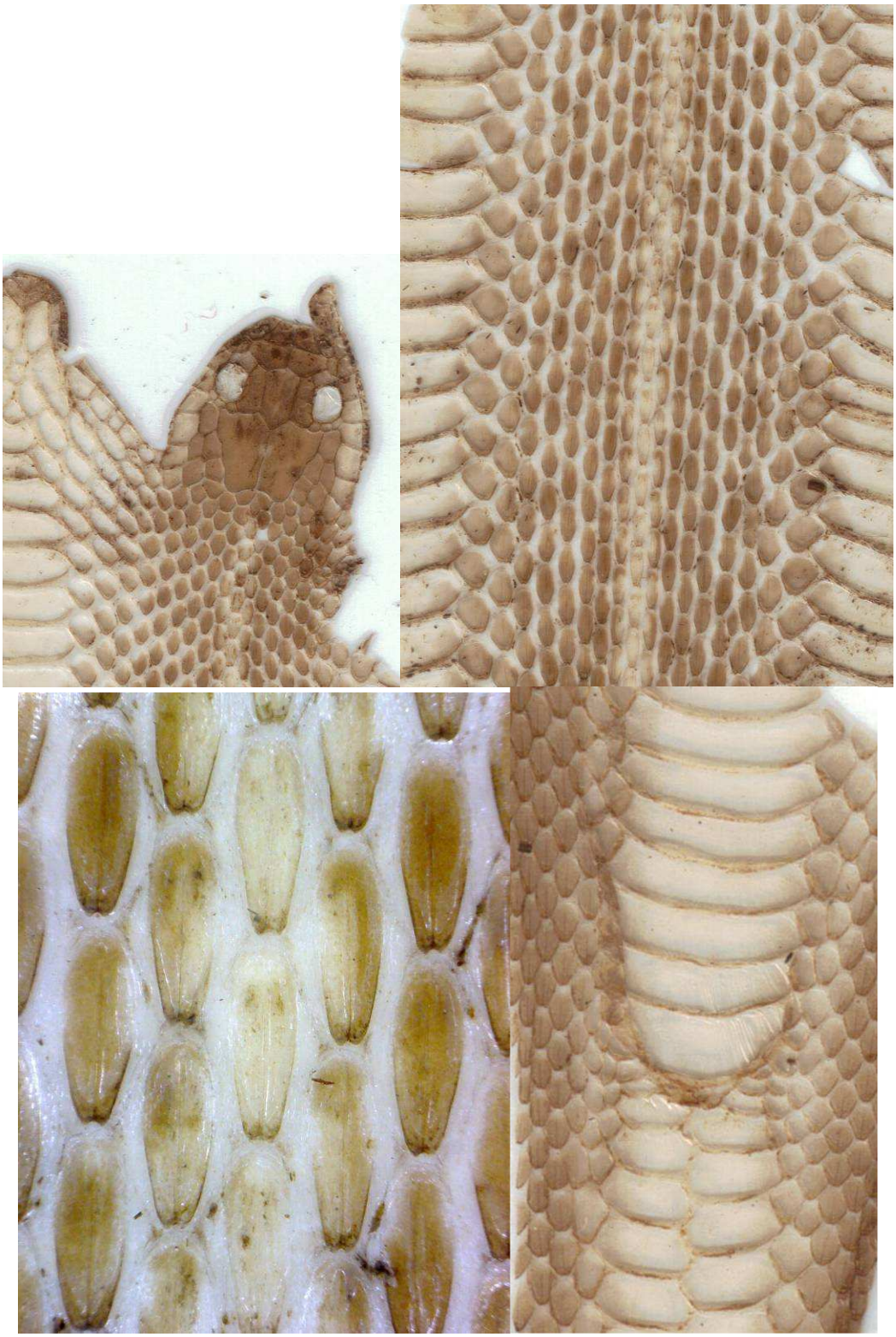
Pigmentation: Crown of head uniformly pigmented, light parietal spots present; lateral stripes on DSR 2and 3, vertebral stripe may have a wavy appearance due to intrusion by dark blotches; vertebral stripe does not extend onto parietals.

Distribution: southwest Saskatchewan, southern and central Alberta and British Columbia.

References: Preston 1982; Nussbaum et al. 1983; Russell and Bauer 1993; Rossman et al. 1996; Matsuda et al. 2006; Seburn and Brooks 2007.

Explanation of Plate 20: Upper left: head section of *T. elegans* shed skin. Upper right: midbody section of *T. elegans*. Lower left: magnified dorsal scales of *T. elegans* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *T. elegans* shed skin.

PLATE 21. Northwestern Garter Snake, *Thamnophis ordinoides*



Northwestern Garter Snake, *Thamnophis ordinoides* (Plate 21)

Scalation: Head scales normal; 1-2 preoculars; postoculars 3; temporals 1+2; supralabials 7, POSL 4; infralabials 8-9; posterior chin shields longer than anterior pair; dorsal scales keeled, with an apical notch; apical pits not visible; DSR 17 at midbody; 134-160 ventrals; anal plate entire; 55-82 divided subcaudals.

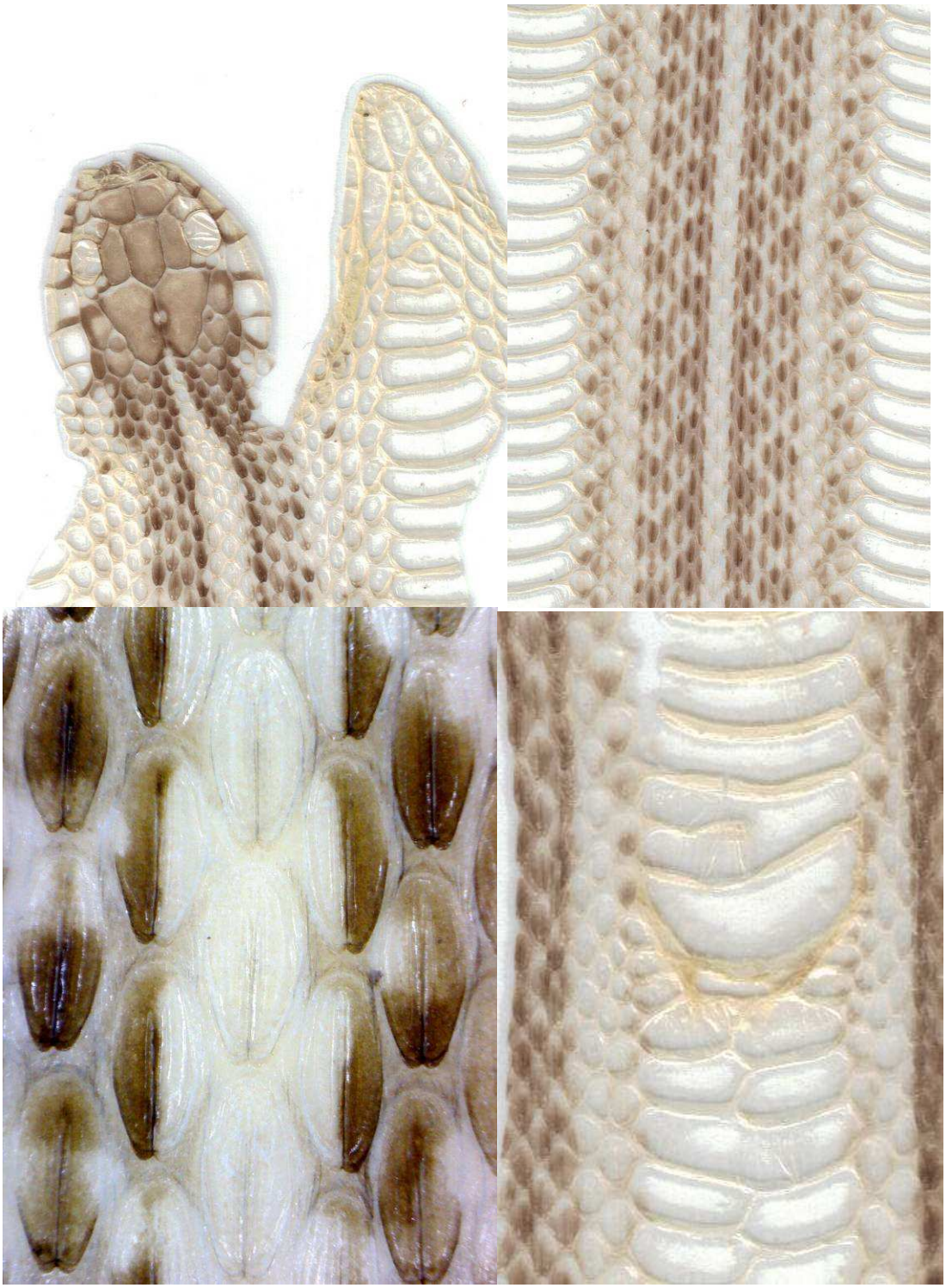
Pigmentation: Crown of head uniformly pigmented, light parietal spots may be present; light vertebral stripe does not extend onto parietals, lateral stripes on DSR 2and 3.

Distribution: southwestern coast of British Columbia, including Vancouver Island and the Gulf Islands, and inland to Manning Park; there is also an isolated record at Kingsquit.

References: Nussbaum et al. 1983; Rossman et al. 1996; Ernst and Ernst 2003; Matsuda et al. 2006; Seburn and Brooks 2007.

Explanation of Plate 21: Upper left: head section of *T. ordinoides* shed skin. Upper right: midbody section of *T. ordinoides*. Lower left: magnified dorsal scales of *T. ordinoides* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *T. ordinoides* shed skin.

PLATE 22. Plains Garter Snake, *Thamnophis radix*



Plains Garter Snake, *Thamnophis radix* (Plate 22)

Scalation: Head scales normal; 1 preocular; postoculars 3; temporals 1+2; supralabials 7-8, POSL 4; infralabials 9-10; posterior chin shields longer than anterior pair; dorsal scales keeled, with an apical notch; paired apical pits; DSR 21 at midbody, occasionally 19; 135-175 ventrals; anal plate entire; 54-88 divided subcaudals.

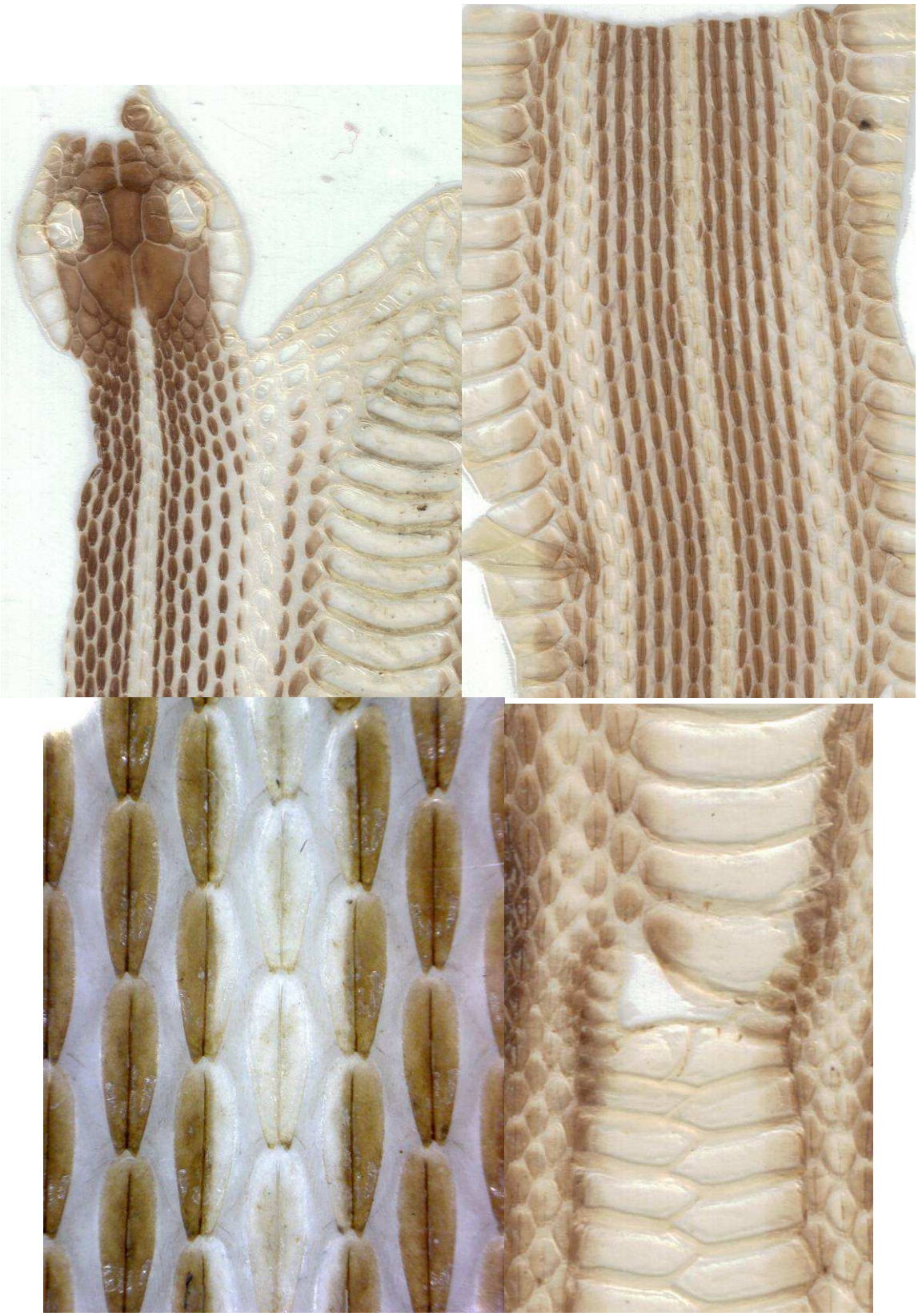
Pigmentation: Crown of head uniformly pigmented, dark bordered light parietal spots present; dark pigment on sutures between supralabial scales; light vertebral stripe usually doesn't contact parietals; lateral stripes on DSR 3 and 4, dark blotches form checkered pattern between stripes.

Distribution: southern Alberta, Saskatchewan, and Manitoba.

References: Preston 1982; Russell and Bauer 1993; Rossman et al. 1996; Ernst and Ernst 2003; Seburn and Brooks 2007.

Explanation of Plate 22: Upper left: head section of *T. radix* shed skin. Upper right: midbody section of *T. radix*. Lower left: magnified dorsal scales of *T. radix* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *T. radix* shed skin.

PLATE 23. Eastern Ribbon Snake, *Thamnophis sauritus*



Eastern Ribbon Snake, *Thamnophis sauritus* (Plate 23)

Scalation: Head scales normal; 1 preocular; postoculars 3; temporals 1+2; supralabials 7, POSL 4; infralabials 10; posterior chin shields longer than anterior pair; dorsal scales keeled, with an apical notch; paired apical pits; DSR 19 at midbody; 143-177 ventrals; anal plate entire; 94-136 divided subcaudals.

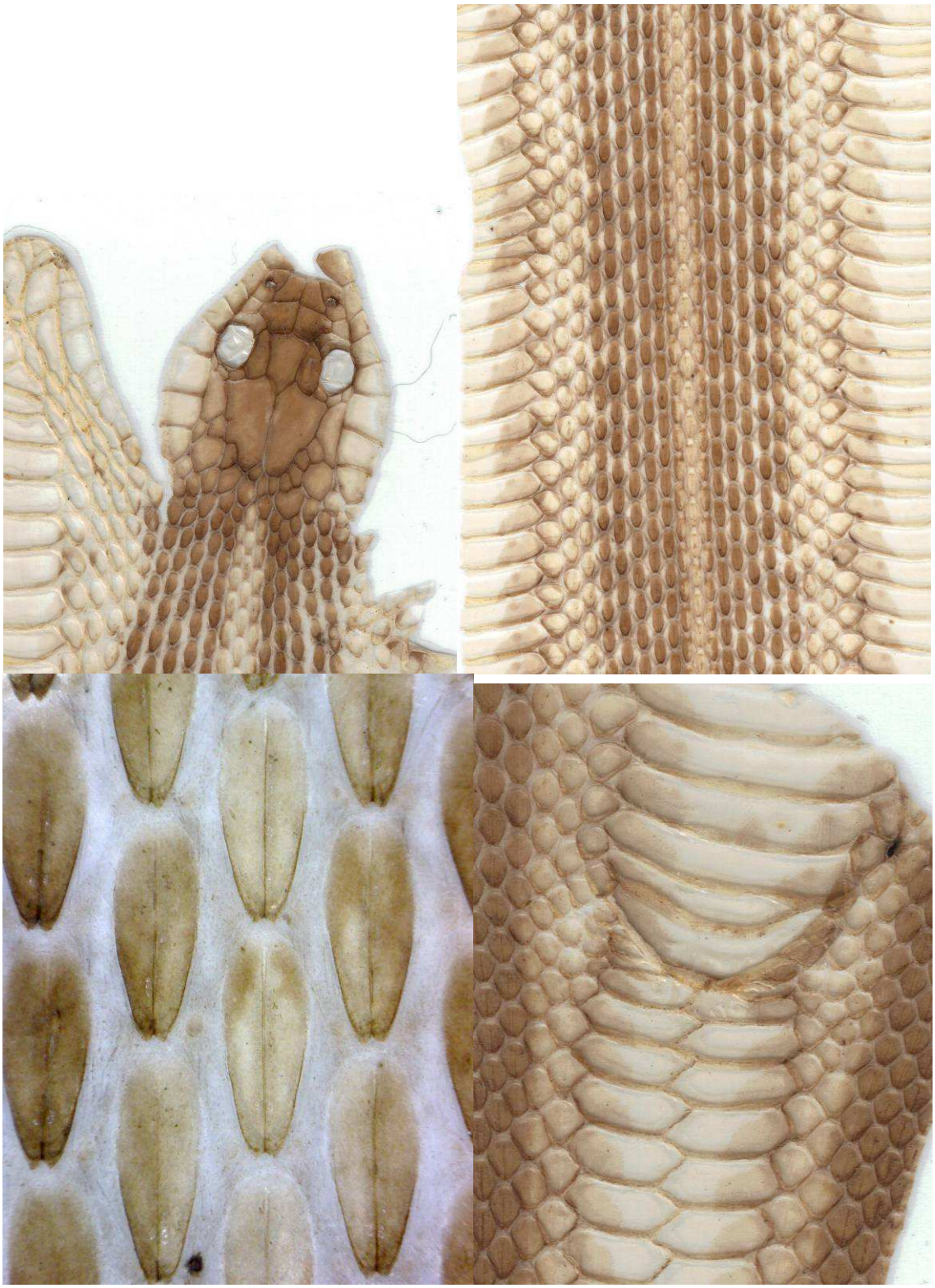
Pigmentation: Crown of head uniformly pigmented, preoculars mostly pigment-free; no or very little pigment on supralabials; parietal spots not usually present, if they are they are almost never fused; light vertebral stripe extends onto the parietals; lateral stripes on DSR 3 and 4.

Distribution: southern Ontario and western Québec; a disjunct relict population also occurs in Queens County, Nova Scotia.

References: Gilhen 1984; Logier 1958; Rossman et al. 1996; Ernst and Ernst 2003; Desroches and Rodrigue 2004; Seburn and Brooks 2007.

Explanation of Plate 23: Upper left: head section of *T. sauritus* shed skin. Upper right: midbody section of *T. sauritus*. Lower left: magnified dorsal scales of *T. sauritus* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *T. sauritus* shed skin.

PLATE 24. Common Garter Snake, *Thamnophis sirtalis*



Common Garter Snake, *Thamnophis sirtalis* (Plate 24)

Scalation: Head scales normal; 1 preocular; postoculars 3; temporals 1+2; supralabials 7, maybe 8 in the western portion of the range, POSL 4; infralabials 10, although 9 is common in Manitoba (Rossman et al. 1996); posterior chin shields longer than anterior pair; dorsal scales keeled, with an apical notch; paired apical pits; DSR 19 at midbody; 130-154 ventrals; anal plate entire; 50-71 divided subcaudals.

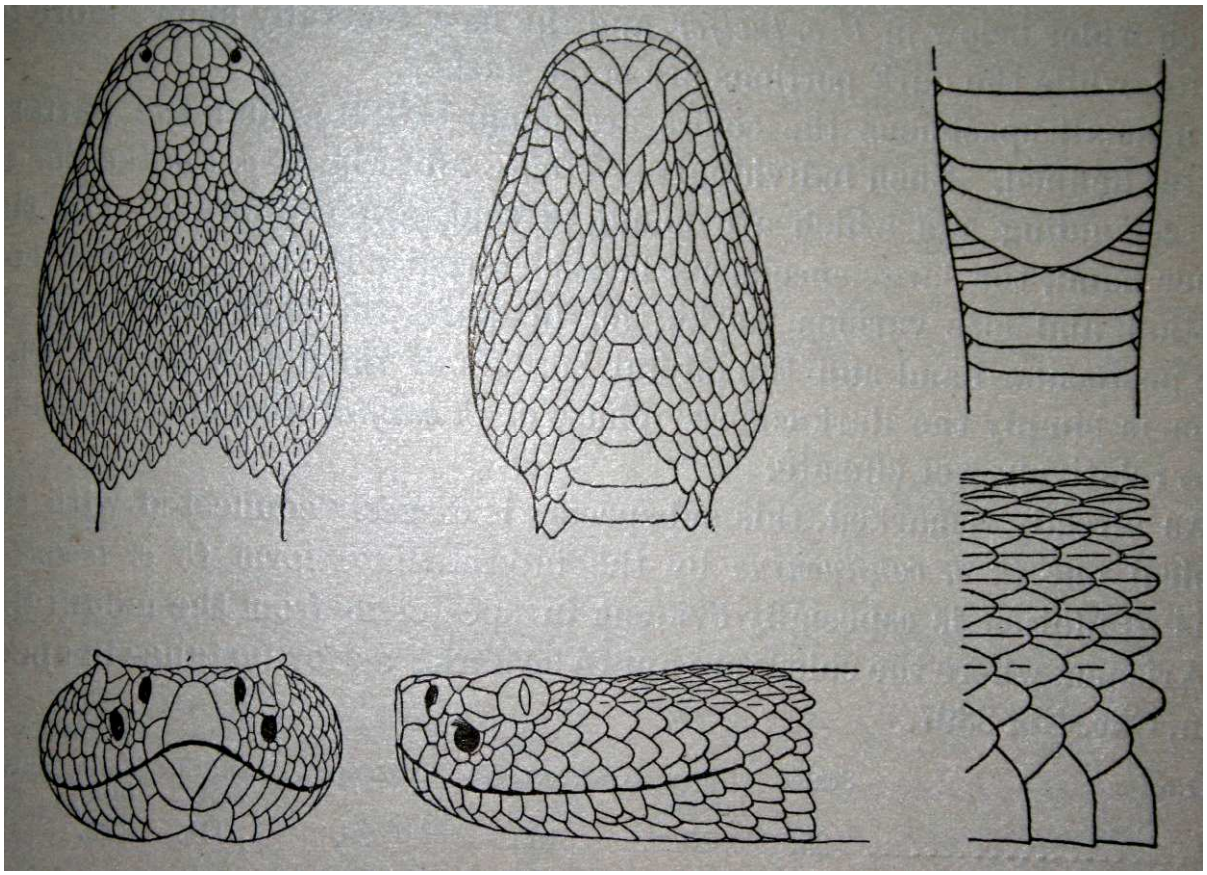
Pigmentation: Crown of head uniformly pigmented; light vertebral stripe usually doesn't contact parietals, and may be lacking; lateral stripes on DSR 2 and 3, dark blotches may form a checkered pattern between stripes.

Distribution: occurs in all Canadian provinces except Newfoundland and Labrador.

References: Logier 1958; Preston 1982; Gilhen 1984; Russell and Bauer 1993; Rossman et al. 1996; Ernst and Ernst 2003; Seburn and Brooks 2007.

Explanation of Plate 24: Upper left: head section of *T. sirtalis* shed skin. Upper right: midbody section of *T. sirtalis*. Lower left: magnified dorsal scales of *T. sirtalis* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *T. sirtalis* shed skin.

PLATE 25. Northern Pacific Rattlesnake, *Crotalus oreganus*



Northern Pacific Rattlesnake, *Crotalus oreganus* (Plate 25)

Scalation: Crown of head with numerous small scales; 2 preoculars; postoculars 2; several suboculars; numerous small scales in temporal region; supralabials 11-18; infralabials 12-20; posterior chin shields reduced; dorsal scales keeled, lacking an apical notch, paired apical pits; DSR 23-27 at midbody; 161-190 ventrals; anal plate entire; 15-29 mostly entire subcaudals.

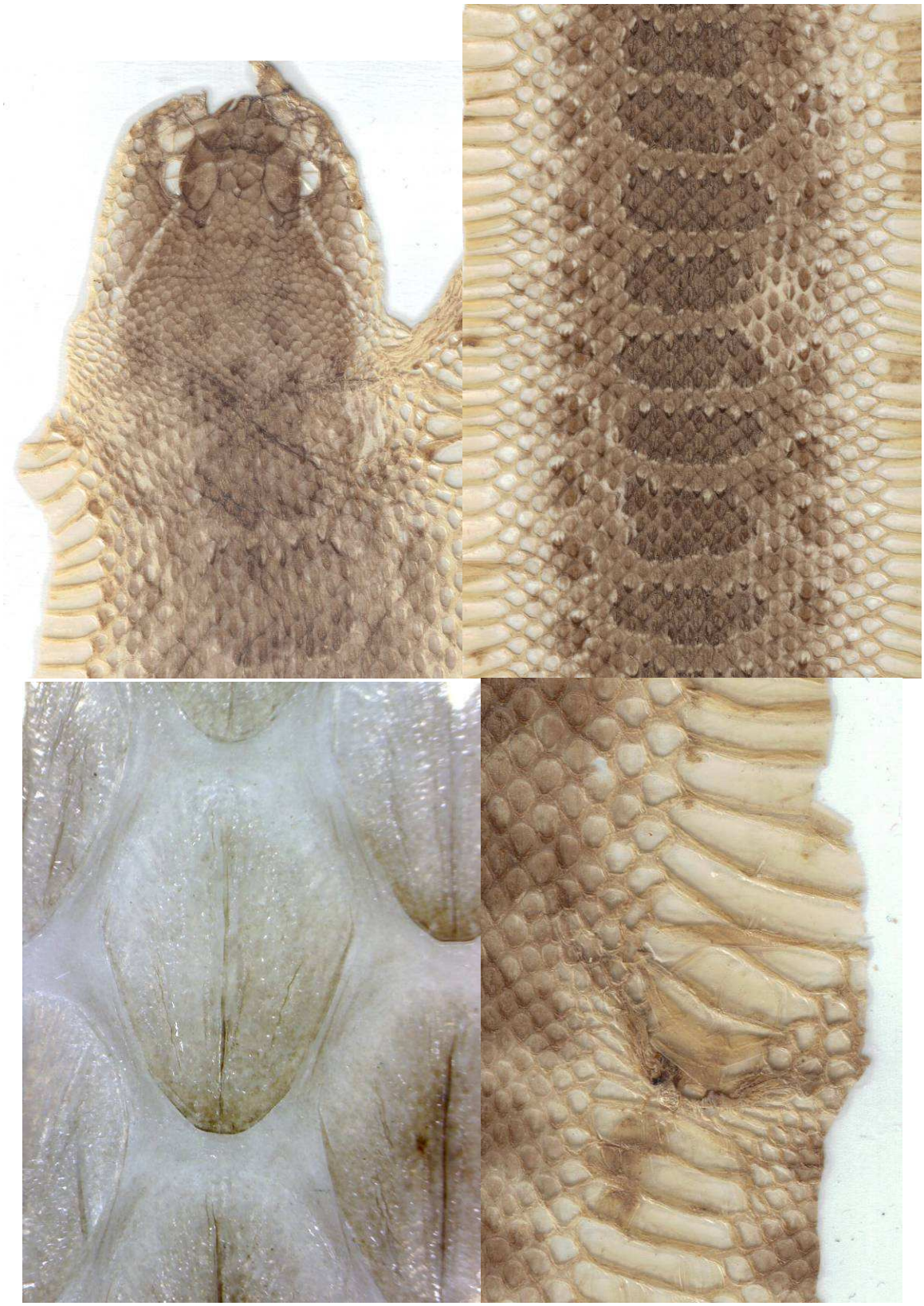
Pigmentation: Crown of head uniformly pigmented, a light stripe from behind the spectacle to above the angle of the mouth, some small dark blotches on parietal area; large, light bordered blotches on body, 20-41 in number.

Distribution: restricted to extreme south-central British Columbia.

References: Nussbaum et al. 1983; Ernst and Ernst 2003; Matsuda et al. 2006; Campbell and Lamar 2007; Seburn and Brooks 2007.

Explanation of Plate 25: Illustration from Cope (1900) of *Crotalus confluentus lucifer* (now *C. oreganus*). The pattern and scalation of *Crotalus oreganus* is very similar to that of *C. viridis*, and it is therefore recommended that the user of this guide consult Plate 26, *C. viridis*.

PLATE 26. Prairie Rattlesnake, *Crotalus viridis*



Prairie Rattlesnake, *Crotalus viridis* (Plate 26)

Scalation: Crown of head with numerous small scales; 2 preoculars; postoculars 2; several suboculars; numerous small scales in temporal region; supralabials 10-18; infralabials 11-19; posterior chin shields reduced; dorsal scales keeled, lacking an apical notch, paired apical pits; DSR 23-29 at midbody; 164-196 ventrals; anal plate entire; 16-31 mostly entire subcaudals.

Pigmentation: Like that of *Crotalus oreganus*. Crown of head uniformly pigmented, a light stripe from behind the spectacle to above the angle of the mouth, some small dark blotches on parietal area; large, light bordered blotches on body, 33-57 in number.

Distribution: extreme southwestern Saskatchewan and southeastern Alberta.

References: Russell and Bauer 1993; Ernst and Ernst 2003; Campbell and Lamar 2007; Seburn and Brooks 2007.

Explanation of Plate 26: Upper left: head section of *C. viridis* shed skin. Upper right: midbody section of *C. viridis*. Lower left: magnified dorsal scales of *C. viridis* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *C. viridis* shed skin.

PLATE 27. Massasauga, *Sistrurus catenatus*

Massasauga, *Sistrurus catenatus* (Plate 27)

Scalation: Crown of head with nine large plates; 2 preoculars, upper one contacts post nasal; 3-4 postoculars; 1-2 suboculars; temporal region with numerous small scales; supralabials 11-12; infralabials 12-13; posterior chin shields reduced; dorsal scales keeled, lacking an apical notch, paired apical pits; DSR 23-25 at midbody; 129-160 ventrals; anal plate entire; 19-36 mostly entire subcaudals.

Pigmentation: On the crown is a dark bar crossing prefrontals and anterior portion of supraoculars; elongated dark blotches on frontal and parietals; thick dark stripe extending from the posterior of the spectacle to above the angle of the mouth. On the body are 21-50 dark bordered dorsal blotches, with smaller alternating lateral blotches.

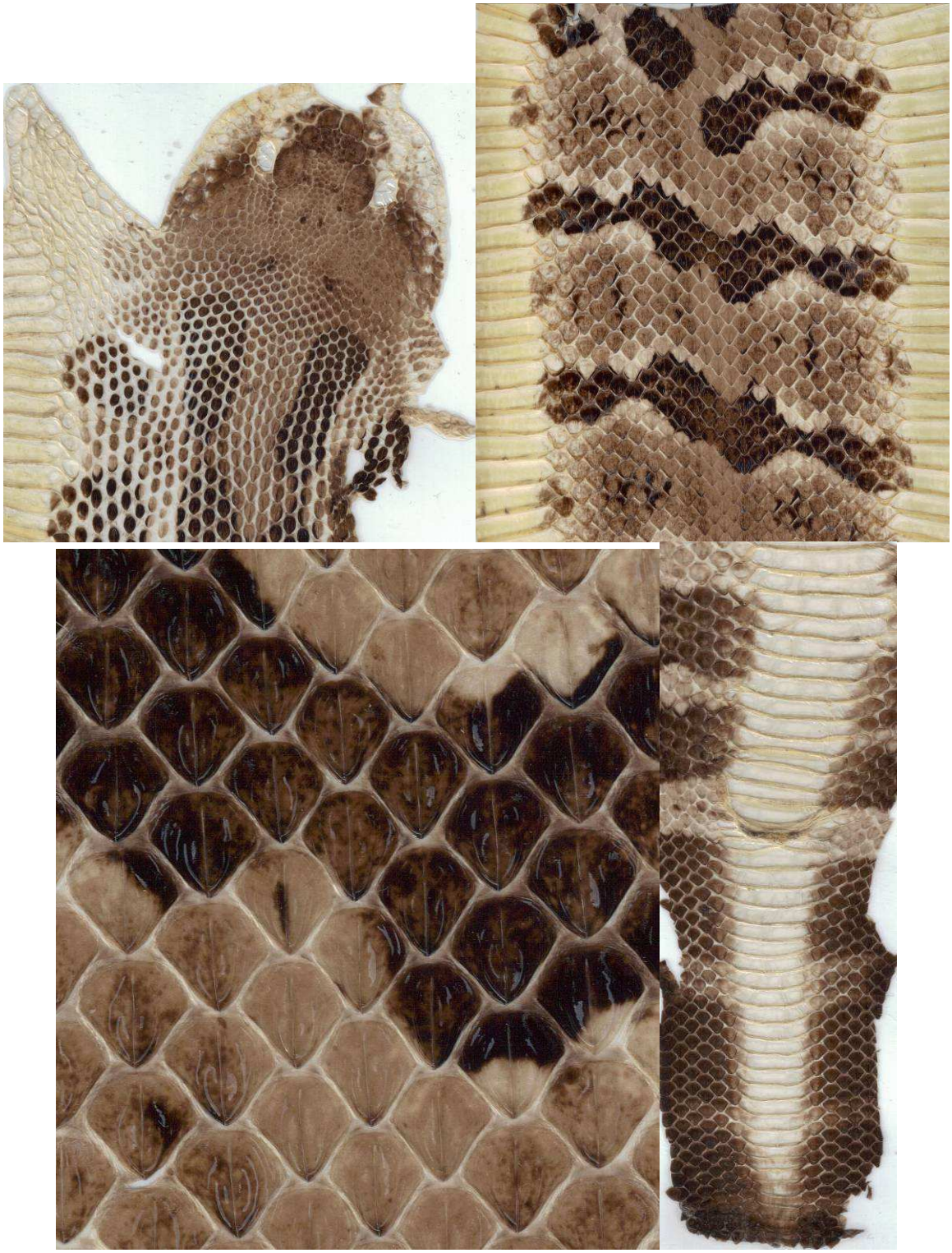
Distribution: southern Ontario, area of Georgian Bay and the Bruce Peninsula, Ojibway Prairie (Windsor/LaSalle) and Wainfleet Bog near Port Colborne.

References: Logier 1958; Ernst and Ernst 2003; Campbell and Lamar 2007; Seburn and Brooks 2007.

Explanation of Plate 27: Upper left: head section of *S. catenatus* shed skin. Upper right: midbody section of *S. catenatus*. Lower left: magnified dorsal scales of *S. catenatus* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *S. catenatus* shed skin.

Extirpated Species

PLATE 28. Timber Rattlesnake, *Crotalus horridus*



Extirpated Species

Timber Rattlesnake, *Crotalus horridus* (Plate 28)

The Timber Rattlesnake is reported as extirpated from Canada (Seburn and Brooks 2007), and was therefore excluded from the key to shed skins. Despite this, I have included this account and plate in the unlikely event that a shed skin found in the species former range in Ontario is thought to be from a Timber Rattlesnake.

Scalation: Crown of head with numerous small scales; 2 preoculars; postoculars 2-6; several suboculars; numerous small scales in temporal region; supralabials 13-15; infralabials 14-16; posterior chin shields reduced; dorsal scales keeled, lacking an apical notch, paired apical pits; DSR 23-25 at midbody; 154-183 ventrals; anal plate entire; 13-31 mostly entire subcaudals.

Pigmentation: on the body are 15-34 chevron or V-shaped bands, the tail is darkly pigmented.

Distribution: extirpated from Canada, formerly the Niagara Gorge in southern Ontario.

References: Logier 1958; Campbell and Lamar 2007; Seburn and Brooks 2007.

Explanation of Plate 28: Upper left: head section of *C. horridis* shed skin. Upper right: midbody section of *C. horridis*. Lower left: magnified dorsal scales of *C. horridis* shed skin. Lower right: Ventrals, anal plate, and subcaudals of *C. horridis* shed skin.

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