

Three New Subspecies of *Trachemys venusta* (Testudines: Emydidae) from Honduras, Northern Yucatán (Mexico), and Pacific Coastal Panama

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Abstract. Upon examination of live and preserved specimens from across the species range, several unnamed distinct forms of *Trachemys venusta* (Gray, 1855) were recognized, leading to the description here of three biogeographically isolated, morphologically distinct subspecies: *Trachemys venusta uhrigi* **ssp. nov.**, *Trachemys venusta iversoni* **ssp. nov.**, and *Trachemys venusta panamensis* **ssp. nov.** Head and neck stripes, along with carapacial and plastral patterns are critical to identification in this group. Formal descriptions and diagnoses are given herein. Other Central American *Trachemys* are also discussed for comparison.

Keywords: Turtle, emydid, *Trachemys venusta uhrigi* **ssp. nov.**, *Trachemys venusta iversoni* **ssp. nov.**, *Trachemys venusta panamensis* **ssp. nov.**, Honduras, Mexico, Panama, Meso-America.

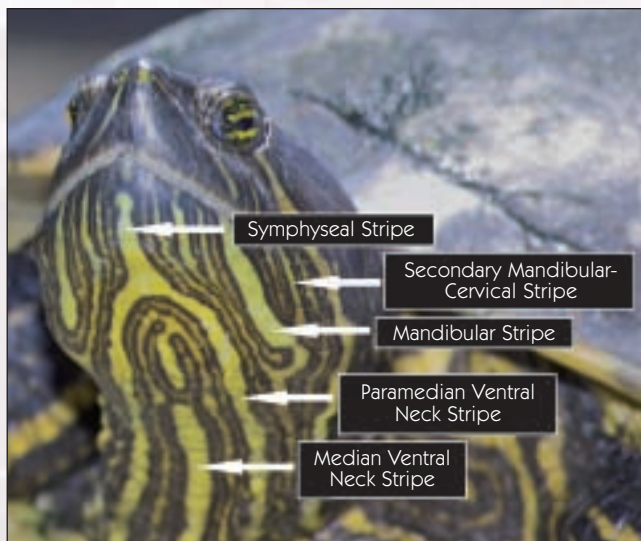
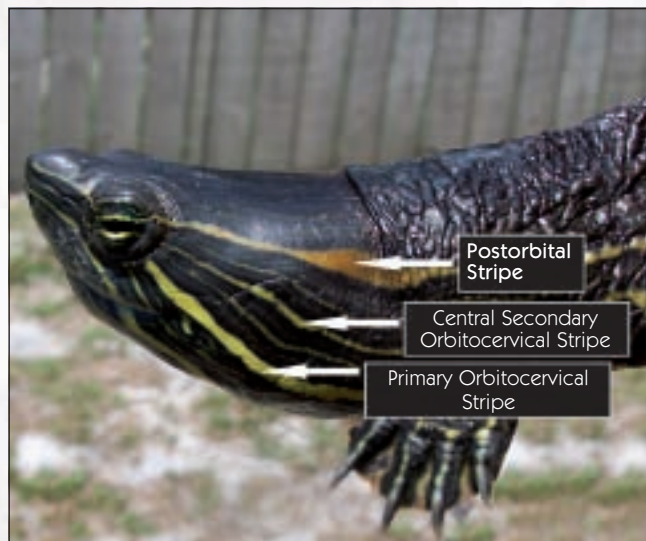


Slider turtles of the genus *Trachemys* Agassiz, 1857, range from north and east of the Rio Grande in the United States, through Mexico, Central America, the West Indies, and South America as far as northeastern Argentina. IVERSON (1985) resurrected *Trachemys* from synonymy with *Pseudemys* (Gray, 1855). SEIDEL (2002) elevated *Trachemys scripta venusta* (Gray, 1855) to full specific status with three subspecies (see below). For taxonomic changes between original descriptions and present usage of all species and subspecies in this paper, see the synonymy lists in FRITZ and HAVAS (2007). Dispersal of North American ancestral stock along coastal regions and across the interior in narrow or lowland areas has led to widespread distribution of *T. venusta* with multiple subspecies on both coasts of Central America (LEGLER, 1990).

Further discussion of *Trachemys venusta* requires an understanding of exactly what Gray described in 1855.

GRAY (1855) declared eight syntypes for his “Venus-like” *Emys* without designating a holotype. However, in 1873 he referred to only one syntype as “*Emys venusta*”: stuffed specimen “e” (1845.8.5.26) in the British Museum of Natural History, labeled “Charming *Emys*” for its beautiful pattern — this reference led SMITH and SMITH (1979) to designate BMNH 1845.8.5.26 (Dyson collection) as the species lectotype, retaining Gray’s original uncertain type locality “Honduras” GRAY (1855). Specimen “e” (1845.8.5.26) also appears to be illustrated in “TAB XII.A.” (GRAY, 1855), further supporting its designation (by Code recommendation) as lectotype.

Six of the eight *Trachemys venusta* syntypes (1839.12.26.70, 1844.2.19.3, 1845.10.25.17, 1849.12.7.4, 1849.7.28.25, and 30G) have Belize-like plastral patterns and/or head stripes (see below); one other (30B) is morphologically too vague to identify. [Note: specimen “f” (Gray, 1873) BMNH 1845.10.25.19 is an iguana; Gray intended to give no. 1845.10.25.17 to a



Head and neck stripes: note Y figure on chin, and that the mandibular stripe joins the secondary mandibular-cervical stripe. Photos: H.-D. Philippen

supposed “Honduran” Dyson turtle specimen (Colin McCarthy, pers. comm.) that we feel has a Belize-like plastral pattern]. The lectotype (1845.8.5.26) has lost its plastral and bridge patterns, but the ventral neck stripes and position and quality of the costal ocelli also suggest a Belize origin.

SCHMIDT (1941) stated that “all of the Dyson collection in the British Museum, labeled only “Hondurus,” should be referred to British Honduras” (now Belize). Apparently Dyson (1845) snake specimens from “Honduras” proved to be of Belize origin.

According to Dr. Colin McCarthy (BMNH), the lectotype (1845.8.5.26) was part of a series (1845.8.5.14–39) “from Belize,” that was “purchased from Cuming, collected by Dyson.” The designation “Belize” was not dittoed for the locality of every specimen (even of same species) in the original registry, probably for sake of expediency, even though the source “Dyson” is dittoed for all. This led an earlier curator to list the entire series 1845.8.5.14–39 as from Belize in his reptile notebook for the museum. We conclude that GRAY (1855) was mistaken in giving “Honduras” as locality for specimen “e” (1845.8.5.26), now the lectotype. Therefore, we herein emend the type locality of *Emys venusta*, Gray, 1855, to Belize (= British Honduras), thus allowing taxonomic continuity and stability, while satisfying Gray’s original intention.

Next we resolve the status of two synonyms of *Trachemys venusta* (Gray, 1885). Four years after Gray described *Emys venusta*, LECONTE (1859) described *Emys valida* with the type locality “Honduras.” The holotype (Acad. Nat. Sci. Philadelphia 216) consists of a head, two front feet, and a tail. The shell was destroyed in transit and is not available. We herein emend the type locality of *Emys valida* LeConte, 1859, to Pacific coastal drainages of Honduras (the southeasternmost end of *Trachemys*

venusta grayi’s range) for the following reasons (quotes are from the original description): shell “nearly two feet long” (*T. v. grayi* reaches 60 cm; Caribbean Hondurans reach 30 cm; Uhrig collection; SMITH and SMITH, 1979); “jaws serrate in the same manner as the *E. mobilensis*” (PRITCHARD, 1979, states “with all Pacific *Pseudemys*, the jaw edges are markedly serrate” — the jaws of Atlantic or Caribbean specimens are smooth or finely serrate); and the median and paramedian ventral neck stripes are of equal width, as is also the case with *T. v. grayi* (paramedian stripes are wider than median stripes in Caribbean Hondurans). Considering the *T. v. grayi*-like diagnostic features of *Emys valida*, the emended locality of *Emys valida* to Pacific coastal Honduras, and mention by PRITCHARD (1979) that he was given a *T. v. grayi* carapace in Tegucigalpa, Honduras, we herein designate *Emys valida* LeConte, 1859 a synonym of *T. v. grayi*. Furthermore, according to SMITH and SMITH (1979), “*valida* was never adopted as valid after its description in 1859.” Therefore, we herein designate *Emys (Ptychemys) valida* LeConte, 1859, as a *nomen oblitum* to avoid taxonomic instability.

Thirty years after Gray described *Emys venusta*, GÜNTHER (1885) described *Emys salvini* with type locality “Guatemala.” The holotype is BMNH 1946.1.22.76 (formerly 64.2.19.5) and is depicted in “Tabb. II & III.” as drawings in the book with the description. We find that this specimen morphologically matches the Belize *T. venusta* (Gray, 1855), making *E. salvini* Günther, 1885, a subjective junior synonym of *T. venusta* (Gray, 1855).

Until MOLL and LEGLER (1971) recognized *Pseudemys scripta venusta* (= *Trachemys venusta* today), most authors considered it a synonym of *Trachemys ornata* (Gray, 1831). *Trachemys ornata* sensu stricto occurs only along the Pacific coast of Mexico from Culiacán, northern



Trachemys ornata. Photos: D. MacKinnon



Trachemys ornata: note widening of postorbital stripe; the mandibular stripe joins the primary orbitocervical. Photo: R. Gurley

Sinaloa, southward to the region of Acapulco, central Guerrero. In *Trachemys ornata* the postorbital stripe starts thin at the orbit and then expands (widens) over the tympanum, making it the dominant head stripe; the mandibular stripe joins the primary orbitocervical stripe (or sometimes a secondary mandibular-cervical stripe); the symphyseal stripe joins the paramedian neck stripes forming a Y-shaped marking on the chin; the mandibular tomium is coarsely serrate; the carapace reaches 38 cm, and is widest at the seam between the 7th and 8th marginal scutes; costal ocelli occupy the posteromedial surface of the scute, are dark centered, irregular, often incomplete, and of a diameter often half or less than half the width of the



Trachemys emolli: note fading of secondary carapace scute patterns; postorbital stripe does not contact orbit and is constricted on tympanum. On the plastron note the "bow-tie" figure at the anterior. Photos: K. Edwards



Trachemys venusta venusta: note widening of costal ocelli laterally; costal ocelli almost fill the scutes. On the plastron note central fading, leaving an empty double-lined figure. Photos: D. Uhrig

scute; the first vertebral scute is wider than long; there are two or three light stripes on each bridge; the adult plastral pattern consists of a medial pair of dark lines on each scute surrounding an open area with lateral extension on 50% of the remaining seam extremities; hatchlings may also have a median seam-following pattern, the overall pattern being squared-off at both ends with a posterior dip in the pattern on the lateral humeral/pectoral seam; the plastral seam formula starts with $abd > an > fem$; rump pattern consists of 25–30 yellow blotches or spots aligned vertically.

LEGLER (1990) described *Trachemys emolli* from Lakes Managua, Nicaragua and adjacent waters. In this taxon, the postorbital stripe does not contact the orbit, and is relatively wide with a constriction over the tympanum that may form a bi-lobate marking or may terminate the stripe creating an isolated oblong or round orange spot; the postorbital stripe is the dominant head stripe; the mandibular stripe is isolated; the symphyseal stripe is connected to the paramedian neck stripes forming a Y on the chin; the ventral paramedian stripes are wider than

the median neck stripe; primary costal ocelli occupy 25–50% of the scute on its posteromedial surface; secondary costal ocelli fade in adults so that only the often incomplete primary costal ocelli remain surrounding dark centers; secondary orange markings on the vertebral scutes also fade with age; the carapace reaches 40 cm, and is widest at the 7th marginal; the first vertebral scute is longer than wide; the bridges have two light lines; the plastral pattern of hatchlings is greatly reduced, with bold dark lines longitudinally following closely both sides of the median scute seams, but not the intergular seam, and only the anterior half of the interanal seam. Fine dark lines also extend to the full extent of all lateral plastral seams. With age the pattern changes to irregularly cover the central 50–60% of the plastron (lateral extensions fade), with an often isolated bowlike figure developing on the gular/humeral scute seams; the plastral seam formula starts with $abd > an > gul$; the central stripe on the rump is usually broken.

In 1855 Gray described *Emys venusta* (= *Trachemys venusta*). As emended above the type locality is

Belize (= British Honduras). The species ranges through Central America from northern Tamaulipas, Mexico on the Gulf coast, eastern Oaxaca, Mexico on the Pacific coast, to southern Panama on both its Caribbean and Pacific coasts. SEIDEL (2002) designated three subspecies for *T. venusta*: *T. v. venusta*, *T. v. grayi* (Bocourt, 1868), and *T. v. catspila* (Günther, 1885) — these subspecies had all previously been members of the *Pseudemys scripta* subspecies complex, belonging to the *ornata* group.

The subspecies *T. v. venusta* sensu stricto ranges (restricted herein) from just south of Punta del Morro, southward through Veracruz, Oaxaca, and Tabasco, through the southern Yucatán Peninsula (Campeche and Quintana Roo), Mexico, northern Guatemala, Belize, and into Caribbean coastal Guatemala. In this taxon the postorbital stripe is yellow, moderately thin, and contacts the orbit; the primary orbitocervical stripe is two to three times as wide as the postorbital stripe and is the dominant head stripe; the mandibular stripe is isolated; the symphyseal stripe does not connect with the paramedian neck stripes, so no Y is present on the chin; the symphyseal and median neck stripes are wider than the paramedian stripes; the iris is yellow; the mandibular tomium is finely serrate; bright orange primary costal ocelli are very large, bolder laterally, light orange centered, complete on the first three scutes, and fill each scute 95–100% transversely, occupying 50–90% of the posterior scute surface; the carapace reaches 48 cm and is widest at the 7th marginal; the first vertebral scute is wider than long; secondary costal and vertebral scute markings (basically parallel to the median line) do not totally fade. There are two light lines on each bridge. The plastral pattern of hatchlings is greatly reduced (20% of plastral surface) with bold dark lines longitudinally following closely both sides of the median scute seams but not the intergular seam, and only



Trachemys venusta grayi: melanism has obliterated all scute patterns. Photo: R. Gurley

the anterior half of the interanal seam. Fine dark lines also extend on the lateral seams (all but the gular/humeral), varying tremendously from 0–90% of seam length. With age the plastral pattern becomes a medial pair of dark lines surrounding an open area on each scute, and the lateral extensions fade. The plastral seam formula starts with $abd > an > gul$ (usually) or fem . The central stripe on the rump is solid. As with all *T. venusta* the sexes are close in size and the foreclaws are the same (short) in males and females.

In 1868 Bocourt described *Emys grayi* (= *T. v. grayi*), which ranges from the region of Salina Cruz in eastern Oaxaca, southeastward through coastal Chiapas, Mexico, to Pacific coastal Honduras (see PRITCHARD, 1979). In this taxon the postorbital stripe contacts the orbit and is a pale yellow, consistently thin stripe; the pale yellow primary orbitocervical stripe (often splitting to outline the anterior, dorsal, and ventral tympanum) is 50% wider than the postorbital stripe making it barely the dominant head stripe; the mandibular stripe is isolated; the symphyseal

stripe connects with the paramedian neck stripes and forms a Y on the chin; the median and paramedian neck stripes are equal in width; the mandibular tomium is fine to moderately serrate; the snout is often protuberant in both sexes, more so in males; light yellow costal ocelli are dark centered, often incomplete, and are located in the posteromedial corner of the scute surface, with a diameter about 50% of the width of the scute. Melanism obliterates the entire carapacial pattern in adults. The carapace reaches 60 cm (OBST, 1985), is widest at the seam between the 7th and 8th marginals; the first vertebral scute is longer than wide. There are two light lines on each bridge. The plastral pattern of hatchlings is moderately reduced, with bold dark lines longitudinally following both sides of the median scute seams (except the intergular and interhumeral, and only the anterior 75% of the interanal seam). Dark swirling lines cover only the medial 50% of the pectoral/abdominal, abdominal/femoral, and femoral/anal seams. Double bold dark lines also extend from the mid-intergular seam to the medial half of the gular/humeral seam, and drop mid-seam posteriorly over the medial third of the humeral scutes, connecting with bold dark lines (continued laterally by fine dark lines) on the medial humeral/pectoral seams, forming a boxlike figure at the anterior of a generally irregular pattern. The entire plastral pattern fades and is subject to melanism with age. The plastral seam formula starts with

$abd > an > gul$. There is no central stripe on the rump.

In 1885 Günther described *Emys cataspila* (= *T. v. cataspila*), which ranges from the Rio San Fernando drainage of northern Tamaulipas south to the vicinity of Punta del Morro, Mexico, where the Sierra Madre Oriental separates it from *T. v. venusta*. In this taxon the postorbital stripe contacts the orbit, starting thin and yellow to orange, and expanding over the posterior tympanum to an orange patch, making it the dominant head stripe; it then turns yellow as it thins and continues down the neck. There is often a break in the postorbital stripe over the anterior tympanum. The primary orbitocervical stripe is twice the width of the anterior postorbital stripe; the mandibular joins the primary orbitocervical stripe; the symphyseal stripe joins the paramedian stripes and forms a Y on the chin; the median and paramedian stripes of the ventral neck are equal in width; the mandibular tomium is finely serrate or smooth; orange to red costal ocelli are dark centered, often incomplete, and are located in the posterolateral corner of the scute surface. The diameter of the boldest costal ocelli is ~40% of the width of the scute. In many specimens there are multiple ocelli (complete or partial) with dark blotches on the first and second costals. Secondary orange markings are plentiful and chaotic. The vertebral scutes often each have an elongated median black blotch. The black blotches of the marginal scutes are usually on the posterior of each scute, anterior to the intermarginal



Trachemys venusta cataspila: note multiple primary ocelli on the first costal scutes; primary costal ocelli located posterolaterally on the scute; and teardrop-like figures on the lateral humeral/pectoral seams. Photo: D. MacKinnon



Trachemys venusta cataspila: note the break in the postorbital stripe before it widens over the tympanum and that the mandibular stripe joins the primary orbitocervical. Photo: D. Uhrig

seam. The carapace reaches 32 cm, is widest at the 7th marginal, and the first cervical scute is wider than long. There are two light lines on each bridge. The plastral pattern of hatchlings is a reduced or moderately reduced pattern of bold dark lines following all longitudinal and horizontal seams of the plastron except the anterior 80–90% of the intergular seam, sometimes the posterior 10–30% of the interanal seam, and sometimes the outer (lateral) 10% of most horizontal seams. The bold dark lines always reach the full lateral extent of the humeral/pectoral seams where there is a notable, lateral, posteriorly oriented dark rounded figure. The gular/humeral seams often have a simple forked appearance, but a boxlike pattern at the anterior of the plastral figure is not uncommon. In adults the plastral pattern diffuses and fades, with the pattern of the humeral/pectoral seam and the gulars often remaining. The plastral seam formula starts with $abd > an > fem$. The central stripe on the rump is broken into multiple varying lines and yellow blotches.

After many years of working with *Trachemys venusta* we present here original formal descriptions of three new subspecies. This is published to provide a public and permanent scientific record. Date of publication: *Reptilia* (GB) no. 71 (ES no. 84, and IT no. 33), Castelldefels, Spain, mailed 02 August 2010.

UHRIG'S SLIDER TURTLE

Taxonomy

Trachemys venusta uhrigi **ssp. nov.**

Order Testudines Linnaeus, 1758.

Suborder Cryptodira Cope, 1868.

Family Emydidae Rafinesque, 1815.

Holotype (designated herein): Florida Museum of Natural History (FLMNH) 157800, adult female, preserved in alcohol, collected in May 1993 by Dennis Uhrig in the Río Chamelecón, 3.0 km south of San Pedro Sula, Honduras.

Paratype (designated herein): FLMNH 105425, subadult female, preserved in alcohol, collected in



Trachemys venusta uhrigi **ssp. nov.** holotype: note consistently thin costal ocelli, greatly expanded plastral pattern, and four light stripes on bridges. Photos: W. P. McCord



Trachemys venusta uhrigi **ssp. nov.**: note thin neck stripes. Photo: D. Uhrig

December 1976 by Diderot F. Gicca in the Río Ulúa, 8.0 km south of San Pedro Sula, Honduras.

Type locality: Río Chamelecón drainage 3 km south of San Pedro Sula, northwestern Caribbean coastal Honduras.

Distribution: Presently known by these authors from the vicinities of San Pedro Sula and La Ceiba in northwestern Caribbean coastal Honduras eastward to the lower Patuca River drainage, in the region of northeastern Caribbean coastal Honduras called “La Mosquitia.”

Suspected to range along the remaining Caribbean coast of Honduras, Nicaragua (LEGLER, 1990, Fig 7.6, depicts a *T. v. uhrigi* in Caribbean coastal Nicaragua as *P. s. venusta*), Costa Rica, Panama, and into the lower drainages of the Atrato River of northwestern Colombia.

Etymology: Named in honor of Dennis Uhrig, who has dedicated his life to studying and working with all *Trachemys* and *Pseudemys* turtles, and who was the first to notice the uniqueness of this turtle.

Description

In *Trachemys venusta uhrigi* the postorbital stripe contacts the orbit and is yellow and consistently thin; the primary orbitocervical stripe is 25–50% wider than the postorbital stripe making it barely the dominant head stripe; the mandibular stripe is isolated; the symphyseal stripe does not connect with the paramedian neck stripes, so no Y is present on the chin; the paramedian neck stripes are wider than the median stripe; there is often a transverse yellow stripe connecting the two paramedian stripes on the upper ventral neck forming an H-like figure; the iris is bluish green; the mandibular tomium is smooth or finely serrate. Hatchlings have a pale yellow to orange ocellus (incomplete posteriorly), around a green-centered (matches carapace) small black ring posterocentrally located on each costal and vertebral scute. In adults, the consistently thin, pale yellow to orange (complete or incomplete posteriorly) primary ocelli fill 25–50% (of the posteromedial surface) of the costal scutes. Each primary ocellus has a usually solid black blotch in the center, plus two or three incomplete, thin, faded secondary costal rings that fill the anterior and lateral areas of the scute not filled by the primary ocellus. The vertebral scutes in adults display thin, faded irregular triangular figures. The marginals bear dark areas centered on the intermarginal seams. The carapace reaches 30 cm in length, is widest at the seam between the 7th and 8th marginals, and the first vertebral scute is wider than long. There are three or four light lines on each bridge. The plastral pattern of hatchlings is a greatly expanded pattern of bold dark lines involving 90–95% of the total plastron. All but the anterior 15–20% of the gulars, posterior 10–20% of the anals, and the lateral 20% of the humeral, pectoral, abdominal, and femoral scutes are covered with a swirling pattern reaching the lateral extremities of the humeral/pectoral, abdominal/femoral and

femoral/anal seams. The plastral pattern of older adults fades from the center first, eventually with only remnants on the gulars, humerals, and pectorals. The plastral seam formula starts with $abd > an > fem$. The central stripe on the rump is usually broken into three or four yellow segments.

Diagnosis

We herein differentiate *Trachemys venusta uhrigi* **ssp. nov.** from the nominotypical (conspecific) form *T. v. venusta* sensu stricto (as described and with the range given above), and its two neighboring forms *T. v. grayi* (conspecific) and *T. emolli* (congeneric). Of the characters given in the foregoing descriptions, only those differentiating *T. v. uhrigi* from *T. v. venusta*, *T. v. grayi*, and *T. emolli* are given here.

Trachemys v. uhrigi can be differentiated from *T. v. venusta* as follows:

Head and neck. In *T. v. uhrigi* the postorbital stripe is very thin; the primary orbitocervical stripe is also thin (only 25–50% wider than the postorbital); the paramedian stripes are usually wider than the median ventral neck stripe and the iris is bluish green. In *T. v. venusta* the primary orbitocervical stripe is much wider than (2–3 times) the moderately thin postorbital stripe; the median stripe is the widest on the ventral neck, and the iris is yellow.

Carapace. The yellow to orange costal ocelli and secondary markings are very pale on hatchling *T. v. uhrigi*; bolder orange on hatchling *T. v. venusta*. The black costal rings within the ocelli (also on marginals and vertebrals) of hatchlings are shell-green centered in *T. v. uhrigi*; orange in *T. v. venusta*. In adults the primary costal ocelli of *T. v. uhrigi* are consistently thin, pale, solid black centered, and occupy 25–50% of the posteromedial surface of the scute; in *T. v. venusta*, bright orange primary costal ocelli (bolder laterally), having orange within the black centers, occupy 50–90% of the posterior surface of each scute, and 95–100% transversely.

Plastron. There are usually four light lines on each bridge of *T. v. uhrigi*; two in *T. v. venusta*. In juvenile *T. v. uhrigi* the plastral pattern is greatly expanded to cover ~95% of the plastral surface; in *T. v. venusta* the pattern is greatly reduced, involving ~20% of the plastral surface. The plastral seam formula of *T. v. uhrigi* starts with $abd > an > fem$; usually $abd > an > gul$ in *T. v. venusta*. The central stripe on the rump of *T. v. uhrigi* is broken; solid in *T. v. venusta*.

Trachemys v. uhrigi can be differentiated from *T. v. grayi* as follows:

Head and neck. In *T. v. uhrigi*, the yellow postorbital stripe is uninterrupted over the tympanum; in *T. v. grayi* it is pale-yellow, and often splits and outlines the tympanum. In *T. v. uhrigi* the paramedian ventral neck stripes are usually wider than the median stripe; equal widths in *T. v. grayi*. The symphyseal stripe of *T. v. uhrigi* does not connect with the paramedian stripes; with *T. v. grayi* it does, forming a Y on the chin. *T. v. uhrigi* has a finely serrate tomium; moderately serrate in many *T. v. grayi*. In *T. v. uhrigi* the snout is more pointed in males than females; in *T. v. grayi*, the snouts of both sexes are often pointed. The iris is bluish-green in *T. v. uhrigi*; yellow in *T. v. grayi*.

Carapace. In *T. v. uhrigi* the carapacial pattern remains for life; in *T. v. grayi* melanism obliterates all patterns with age. The carapace length of *T. v. uhrigi* is known to reach 30 cm; 60 cm in *T. v. grayi*. The carapace is widest at the 7th marginal in *T. v. uhrigi*; at the seam between the 7th and 8th marginals in *T. v. grayi*. In *T. v. uhrigi* the first vertebral scute is wider than long; longer than wide in *T. v. grayi*.

Plastron. In *T. v. uhrigi* the plastral pattern is greatly expanded; in *T. v. grayi* it is moderately reduced with a boxlike figure at the anterior aspect. The plastral seam formula of *T. v. uhrigi* starts with $abd > an > fem$; in *T. v. grayi*, $abd > an > gul$. *T. v. uhrigi* has a segmented central stripe on the rump; *T. v. grayi* has no central stripe.

Trachemys v. uhrigi can be differentiated from *T. emolli* as follows:

Head and neck. In *T. v. uhrigi* the consistently thin postorbital stripe connects with the orbit; in *T. emolli* it does not reach the orbit, and as the stripe widens over the tympanum there is a constriction creating a bi-lobed appearance, or sometimes terminating the stripe after the first lobe. The primary orbitocervical stripe is dominant in *T. v. uhrigi*; postorbital in *T. emolli*. In *T. v. uhrigi* the symphyseal stripe does not connect with the paramedian neck stripes; in *T. emolli* it does, forming a Y on the chin.

Carapace. In *T. v. uhrigi* all secondary scute markings remain in adults; in *T. emolli* they fade, leaving only primary markings that are more brilliantly colored and wider than in *T. v. uhrigi*. *T. v. uhrigi* reaches ~30 cm in length; *T. emolli*, 40 cm. *T. v. uhrigi* is widest at the 7th marginal; in *T. emolli*, at the

seam between the 7th and 8th marginals. The first vertebral scute of *T. v. uhrigi* is wider than long; longer than wide in *T. emolli*.

Plastron. *T. v. uhrigi* has three or four light lines on each bridge; *T. emolli* has two. The plastral pattern of *T. v. uhrigi* is greatly expanded; in *T. emolli* it is greatly reduced, with a bow-like figure at the anterior aspect in adults. In *T. v. uhrigi* the plastral seam formula begins with $abd > an > fem$; in *T. emolli*, $abd > an > gul$.

IVERSON'S SLIDER TURTLE

Taxonomy

Trachemys venusta iversoni **ssp. nov.**

Order Testudines Linnaeus, 1758.

Suborder Cryptodira Cope, 1868.

Family Emydidae Rafinesque, 1815.

Holotype (designated herein): FLMNH 50478, adult female, preserved in alcohol, collected in April 1981 by John Iverson in a Cenote on the north side of the highway,

13.8 km east of Buctzotz, Yucatán, Mexico.

Paratype (designated herein): FLMNH 50476, subadult female, preserved in alcohol, collected in April 1981 by John B. Iverson in Cenote Xkolar, 16.6 km northeast of Izamal (toward Tunkas), Yucatán, Mexico.

Type locality: A Cenote on the north side of the highway, 13.8 km east of Buctzotz, Yucatán, Mexico.

Distribution: Presently known from the Cenotes in northern Yucatán State, Mexico.

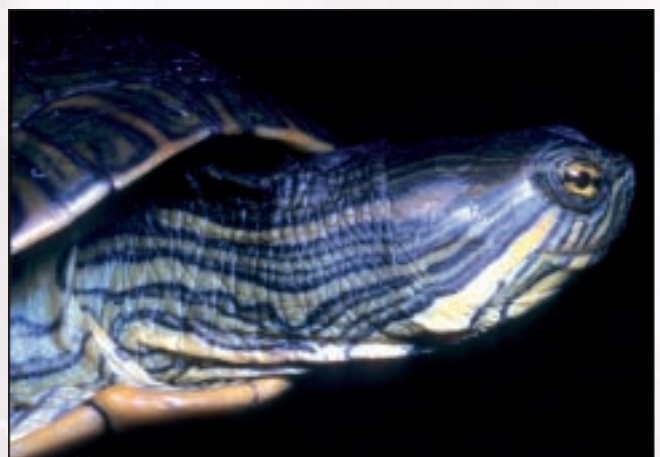
Etymology: Named in honor of John B. Iverson, a Chelonian specialist of the highest caliber, who did much field work with this group of turtles.

Description

In *Trachemys venusta iversoni* the postorbital stripe contacts the orbit as a very thin stripe, then expands to a dull orange patch



Trachemys venusta iversoni **ssp. nov.** holotype: note greatly expanded plastral pattern, and two light stripes on bridge. Photos: G. Salmon



Trachemys venusta iversoni **ssp. nov.**: note postero-central location and consistent width of the primary costal ocelli; golden-yellow iris; bluntness of face; boldness of secondary stripes; and widening of postorbital stripe over tympanum. Photos: J. B. Iverson

over the tympanum, then narrows again and continues down the neck as a moderate stripe; the primary orbitocervical stripe is two to three times the width of the postorbital stripe making it the dominant head stripe; secondary facial stripes are prominent; the mandibular stripe is isolated; the symphyseal stripe does not connect with the paramedian neck stripes, so no Y is present on the chin; the symphyseal and median ventral neck stripes are wider than the paramedian stripes; the iris is golden-yellow; the mandibular tomium is finely serrate; the snout is blunt in both sexes; in hatchlings, pale yellow-orange ocelli surrounding solid black spots (light centered in some) are located postero-centrally on each costal scute surface; adults have consistently moderately wide pale orange costal ocelli filling the postero-centromedial 25–30% of the costal scute surfaces; primary costal ocelli do not contact the vertebral or marginal scute seams; secondary ocelli fill the anterior and lateral costal scutes; primary vertebral scute markings are often symmetrically aligned (parallel) with the median stripe; marginals bear dark areas centered on the inter-marginal seams; carapace length is known to reach 20 cm, and is widest at the seam between the 7th and 8th marginals; the first vertebral scute is usually longer than wide (sometimes equal). There are two light stripes on each bridge. The plastral pattern of hatchlings is a greatly expanded pattern of bold dark lines involving 90% of the total plastron. All but the anterior 20–25% of the gulars, the posterior 20–25% of the anals, and the lateral 20–25% of the humerals, pectorals, abdominals, and femorals are covered with a swirling pattern reaching the lateral extremities of the humeral/pectoral (sometimes pectoral/abdominal), abdominal/femoral, and femoral/anal seams. The lateral pattern on the humeral/pectoral seams is oriented posteriorly and is predominantly on the pectoral scute. The plastral pattern

reaches the posterior end of the median plastral seam in both hatchlings and adults. The plastral seam formula varies: 65% of specimens starting with $abd > an > pect$; 35% starting with $abd > an > fem$. The central stripe on the rump is usually broken.

Diagnosis

We herein differentiate *T. v. iversoni* **ssp. nov.** from the nominotypical form *T. v. venusta* *sensu stricto* (as described herein and with the range given above). Of the characters given in the foregoing description, only those differentiating *T. v. iversoni* from *T. v. venusta* are given here.

Head and neck. The postorbital stripe of *T. v. iversoni* widens over the tympanum; consistently thin in *T. v. venusta*. The coloring of all head stripes are a pale yellow-orange in *T. v. iversoni*; bold yellow in *T. v. venusta*. The secondary head stripes are more prominent in *T. v. iversoni* than *T. v. venusta*. The iris is golden-yellow in *T. v. iversoni*; yellow in *T. v. venusta*. The anterior face of *T. v. iversoni* is blunter (in both sexes) than in *T. v. venusta*.

Carapace. The pale orange, relatively small costal ocelli of *T. v. iversoni* occupy 25–30% (in the postero-centromedial surface) of the overall scute; in *T. v. venusta* the large bold orange costal ocelli occupy 50–90% (of the entire posterior surface) of the overall scute surface. In *T. v. iversoni* the stripe width of the primary costal ocelli is consistent throughout; in *T. v. venusta* it is wider laterally. The primary costal ocelli of *T. v. iversoni* never contact the vertebral or marginal seams; in *T. v. venusta* they often contact one or both seams. In *T. v. iversoni* the primary vertebral scute markings are often aligned in a parallel fashion with the median dorsal stripe; not parallel in *T. v. venusta*. The first vertebral scute is longer than wide (sometimes equal) in *T. v. iversoni*; wider than long in *T. v. venusta*. The carapace length of *T. v. iversoni*

is known to reach 20 cm, and is widest at the seam between the 7th and 8th marginals; 48 cm for *T. v. venusta*, widest at the 7th marginal. The secondary costal and vertebral scute markings of *T. v. iversoni* fade with age; not in *T. v. venusta*.

Plastron. The plastral pattern of *T. v. iversoni* is greatly expanded; greatly reduced in *T. v. venusta*. The plastral seam formula of *T. v. iversoni* begins with $abd > an > pect$ in 65% and $abd > an > fem$ in 35% of specimens studied; in *T. v. venusta*, $abd > an > fem$ in 80%, and $abd > an > gul$ in 20%. The central stripe on the rump of *T. v. iversoni* is usually broken; always solid in *T. v. venusta*.

The plastral pattern of *T. v. iversoni* can be differentiated from the also very expanded pattern of *T. v. uhrigi* as follows. In *T. v. iversoni* the plastral pattern reaches the posterior end of the median seam in both hatchlings and adults; in *T. v. uhrigi* it reaches the posterior end in hatchlings only. In *T. v. iversoni* juveniles, the lateral pattern on the humeral/pectoral seams is oriented posteriorly and ends on the pectoral scute; in *T. v. uhrigi* the humeral/pectoral seam pattern is oriented anteriorly and ends on the humeral scute.

Apparent intergradation, presenting mixed characters of both *T. v. iversoni* and *T. v. venusta* was found as far north as Muna in the northwestern Yucatán Peninsula and Cobá in the northeastern Yucatán Peninsula, both at ~20.5 degrees north latitude.

PANAMANIAN SLIDER TURTLE

Taxonomy

Trachemys venusta panamensis **ssp. nov.**

Order Testudines Linnaeus, 1758.

Suborder Cryptodira Cope, 1868.

Family Emydidae Rafinesque, 1815.

Holotype (designated herein): FLMNH 52511, juvenile preserved in alcohol, collected in July 1968 by H. W. Campbell in Panama (Canal Zone) Chiva-Chiva Road, 1 km from Gaillané Highway.



Trachemys venusta panamensis ssp. nov. holotype: note the vertebral scute patterns. Photos: G. Salmon

Paratype (designated herein): FLMNH 52512, juvenile preserved in alcohol, collected in July 1968 by H. W. Campbell in Panama (Canal Zone) Chiva-Chiva Road, 1 km from Gaillané Highway.

Type locality: Chiva-Chiva Road (trail), 1 km from Gaillané (Gaillard) Highway (Fort Clayton entrance), north of Miraflores Lake, Pacific-side Panama Canal Zone, Panamá Province, Panama.

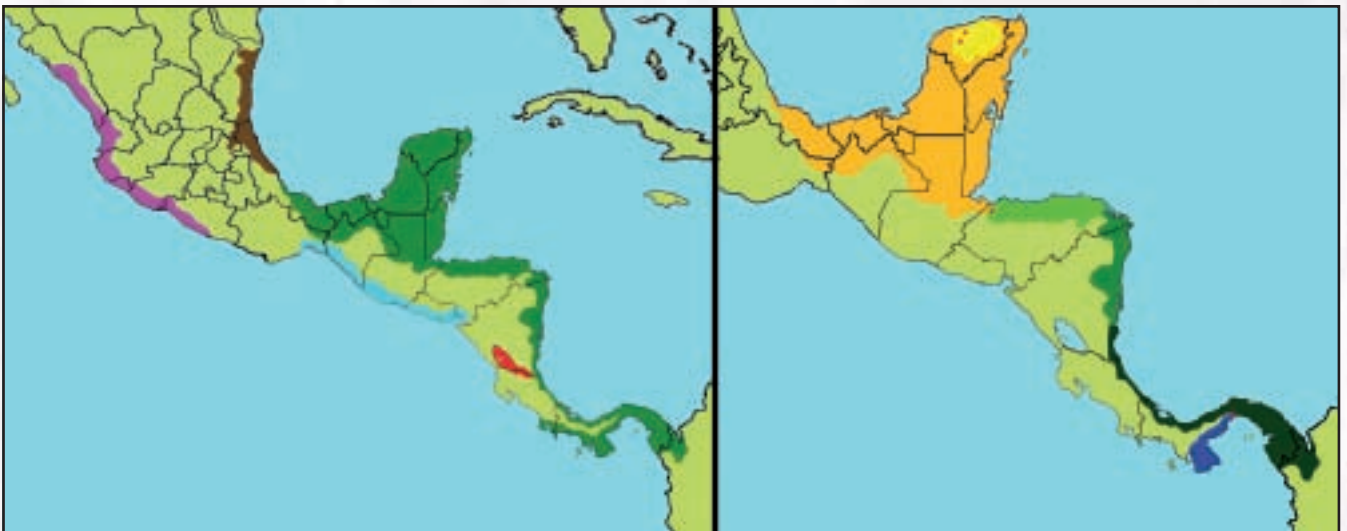
Distribution: “Pacific side of Panama from the Azuero Peninsula at least to the Isthmian region” (LEGLER, 1990, as the “Central American Pacific” population).

Etymology: As the only known endemic form of *Trachemys*, named for the country, Panama, where the turtle naturally occurs.

Description

In *T. v. panamensis* the postorbital stripe contacts the orbit, widens as it passes over the tympanum, then narrows again going posteriorly; the primary orbitocervical stripe is the same width as most of the postorbital stripe, such that, with the expanded width over the tympanum, the postorbital stripe is dominant; the central secondary orbitocervical stripe gradually becomes as wide going posteriorly as the postorbital and primary orbitocervical stripes; the mandibular stripe is isolated; the symphyseal stripe does not connect with the variable paramedian neck stripes, so no Y is present on the chin; the median neck stripe on the posterior ventral neck splits

going laterally, crossing the paramedian stripes to join the primary orbitocervical stripe; the mandibular tomium is finely serrate; pale yellow (see LEGLER, 1990) posterocentrally located, usually complete primary costal ocelli surround light-orange-centered dark areas, and contact the posterior scute seams; secondary costal markings fill the remaining anterior, lateral, and medial surfaces around the primary costal ocelli; light-orange-centered dark areas cover the intermarginal seams; the first and fifth vertebral scutes have primary markings parallel to the median line; the second and third vertebral scutes have a central posteriorly open horseshoe design (often faded); the second, third,



Left: Distributions of *Trachemys* taxa as recognized before this paper: *Trachemys ornata* (purple); *Trachemys emolli* (red); *Trachemys venusta venusta* (forest green); *Trachemys venusta cataspila* (brown); *Trachemys venusta grayi* (light blue). **Right:** Distributions of the herein revised *Trachemys* taxa: *Trachemys venusta venusta* (orange); *Trachemys venusta iversoni* ssp. nov. (yellow, with upper red dot indicating Buctzotz and lower red dot Izamal); *Trachemys venusta uhrigi* ssp. nov. (bright green: confirmed range in Honduras; forest green: probable range; dark green: suspected range; red dot: San Pedro Sula); *Trachemys venusta panamensis* ssp. nov. (blue, with red dot indicating Chiva-Chiva Rd).

and especially the fourth vertebral scutes have a relatively intricate pattern of lateral markings; the carapace of juveniles is widest at the seam between the 7th and 8th marginals; first vertebral scute is wider than long; the bridges have two light lines each; the plastral pattern of hatchlings is reduced with bold dark lines longitudinally following both sides of the median scute seams as far as the posterior half of the intergular seam and the anterior half of the interanal seam. Laterally the bold lines expand to involve 90% of the gular/humeral seams, 20–30% of the humeral/pectoral seams, 80–90% of the pectoral/abdominal seams, 95–100% of the abdominal/femoral seams, and 100% of the femoral/anal seams. In total 30–40% of the plastron is covered by the pattern in hatchlings. The plastral seam formula in hatchlings likely starts with $abd > an > pect$. The central stripe on the rump appears to be solid.

Diagnosis

We herein differentiate *T. v. panamensis* **ssp. nov.** from the nominotypical (conspecific) form *T. v. venusta* *sensu stricto* (as described with the range given above) and its geographically closest conspecific form *T. v. uhrigi*. Of the characters given in the foregoing descriptions, only those differentiating *T. v. panamensis* from *T. v. venusta* and *T. v. uhrigi* are given here.

Trachemys v. panamensis can be differentiated from *T. v. venusta* as follows:

Head and neck. In *T. v. panamensis* the postorbital stripe widens

as it goes over the tympanum making it the dominant lateral head stripe; in *T. v. venusta* it is consistently thin, with the primary orbitocervical stripe being dominant. The central secondary orbitocervical stripe in *T. v. panamensis* widens to match that of the postorbital and primary orbitocervical going posteriorly; thin in *T. v. venusta*. On the lower ventral neck of *T. v. panamensis* the median stripe splits laterally and joins the primary orbitocervical stripe; not so in *T. v. venusta*.

Carapace. The primary carapacial scute markings are pale yellow-orange in *T. v. panamensis*; bold orange in *T. v. venusta*. The bolder vertebral scute markings of *T. v. panamensis* vary from scute to scute; consistently parallel to the dorsal midline in *T. v. venusta*. The carapace of *T. v. panamensis* is widest at the seam between the 7th and 8th marginals; in *T. v. venusta* at the 7th marginal.

Plastron. The plastral pattern of *T. v. panamensis* juveniles is reduced, occupying 30–40% of the plastron; in *T. v. venusta* it is greatly reduced and occupies 20% of the plastron. In juvenile *T. v. panamensis* the interpectoral seam is the third largest seam; in *T. v. venusta* the third largest is the interfemoral or intergular.

Trachemys v. panamensis can be differentiated from *T. v. uhrigi* as follows:

Head and neck. In *T. v. panamensis* the postorbital stripe widens over the tympanum making it the dominant head stripe; in *T. v. uhrigi* it is consistently thin, with the primary orbitocervical stripe

being dominant. The postorbital (excluding over the tympanum), primary orbitocervical, and posterior central secondary orbitocervical stripes are all the same moderate width in *T. v. panamensis*; in *T. v. uhrigi* the postorbital and central secondary orbitocervical stripes are thin and the primary orbitocervical stripe is moderate in width. On the lower ventral neck of *T. v. panamensis* the median stripe splits laterally and joins the primary orbitocervical stripes; instead, in *T. v. uhrigi* there is often a transverse yellow stripe only on the upper ventral neck joining the paramedian stripes at or near the anterior median stripe, creating an H-like figure.

Carapace. The primary costal ocelli in *T. v. panamensis* juveniles are complete as they meet the posterior scute seam and have orange-centered central dark areas; in *T. v. uhrigi* juveniles these ocelli are incomplete posteriorly, and have green-centered central dark areas. The bolder vertebral scute markings of *T. v. panamensis* are more variable than in *T. v. uhrigi*.

Plastron. In *T. v. panamensis* each bridge has two light lines; three or four in *T. v. uhrigi*. The plastral pattern of juvenile *T. v. panamensis* is reduced, occupying 30–40% of the plastron; in *T. v. uhrigi* it is greatly expanded, occupying 90–95% of the plastron. The plastral pattern of juvenile *T. v. panamensis* never reaches the posterior end of the interanal seam; it does in *T. v. uhrigi* juveniles. In *T. v. panamensis* juveniles the interpectoral seam is usually the third

	CL	CW6	CW7	CW8	CD	V1L	V1W	PL	BL	IG	IH	IP	IAb	IF	IAn	HL	HW	HD
<i>Trachemys venusta uhrigi</i>																		
(FLNHM) #157800 holotype	261.91	184.70	188.54	186.99	92.95	43.64	40.81	215.92	89.31	30.39	22.94	28.08	63.76	31.22	37.41	58.76	39.19	31.53
(FLNHM) #105425 paratype	135.39	101.54	107.92	105.58	49.41	23.91	29.02	123.48	48.38	20.03	9.89	21.03	28.45	17.35	24.75	31.09	21.86	17.22
<i>Trachemys venusta iversoni</i>																		
(FLNHM) #50478 holotype	187.07	139.55	139.28	135.80	75.31	33.57	26.92	165.96	66.27	24.73	12.85	24.60	43.62	27.56	31.32	44.47	31.46	23.53
(FLNHM) #50476 paratype	126.26	92.98	96.70	94.25	54.36	23.92	23.08	111.64	47.54	17.32	8.43	20.78	29.41	13.95	21.34	31.66	23.88	16.92
<i>Trachemys venusta panamensis</i>																		
(FLNHM) #52511 holotype	40.09	37.36	37.67	36.31	15.52	9.52	12.07	35.34	11.91	7.53	2.41	6.21	5.67	5.75	7.75	13.74	10.18	6.16
(FLNHM) #52512 paratype	38.42	34.00	34.11	34.19	15.67	8.96	10.84	34.51	10.93	6.50	2.97	5.53	7.00	4.51	7.88	12.23	9.75	6.66

Table 1. Measurement data (in mm) for three new subspecies of *Trachemys venusta*.

Morphometric key: CL = straight midline carapace length; CW 6, 7, 8 = straight carapace width at 6th, 7th and 8th marginals; CD = maximum carapace depth; V1L = first vertebral length; V1W = first vertebral width; PL = midline plastral length; BL = bridge length; IG, IH, IP, IAb, IF, IAn = midline plastral inter-scute seam lengths; HL = maximum head length; HW = head width at tympana; HD = maximum head depth.

longest plastral seam; in *T. v. uhrigi* the third longest is the femoral. The central stripe on the rump of *T. v. panamensis* is usually solid; broken in *T. v. uhrigi*. ■

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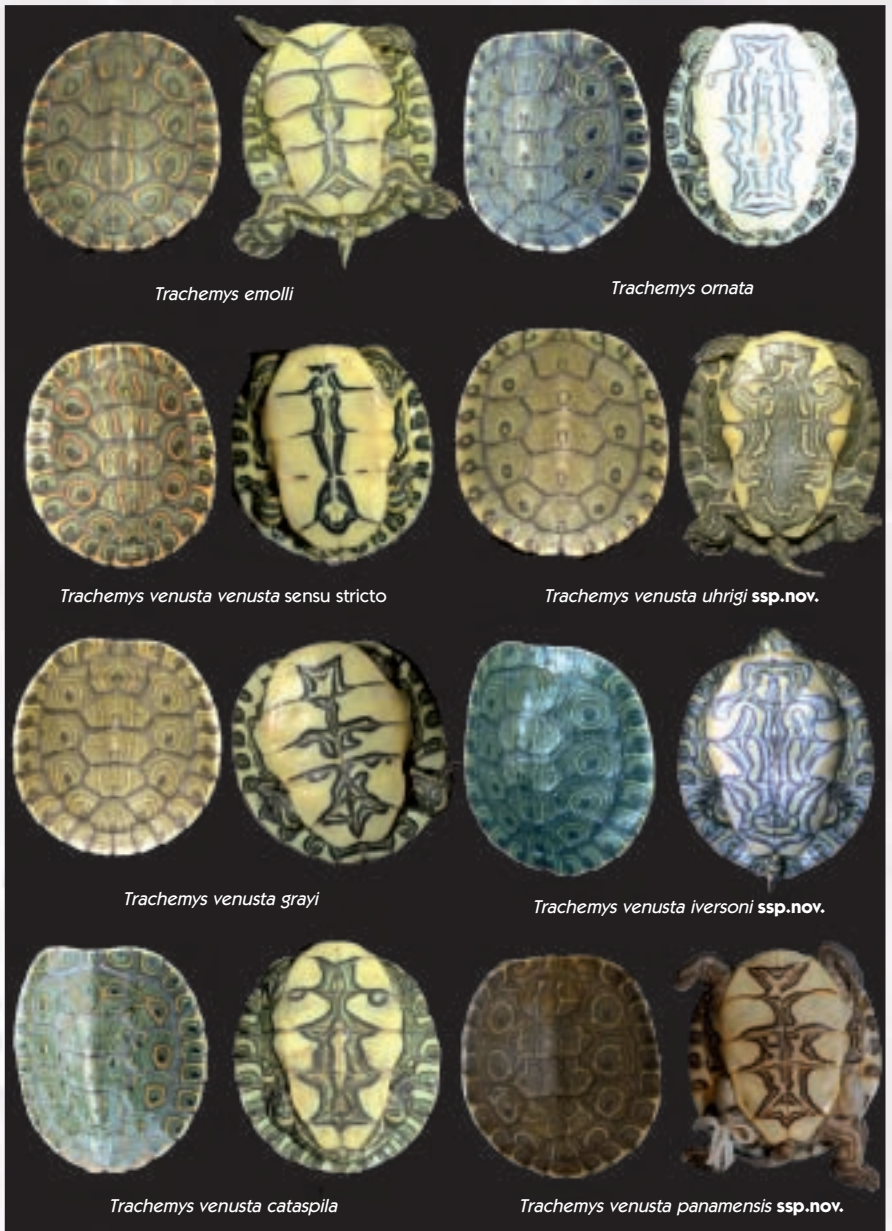
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