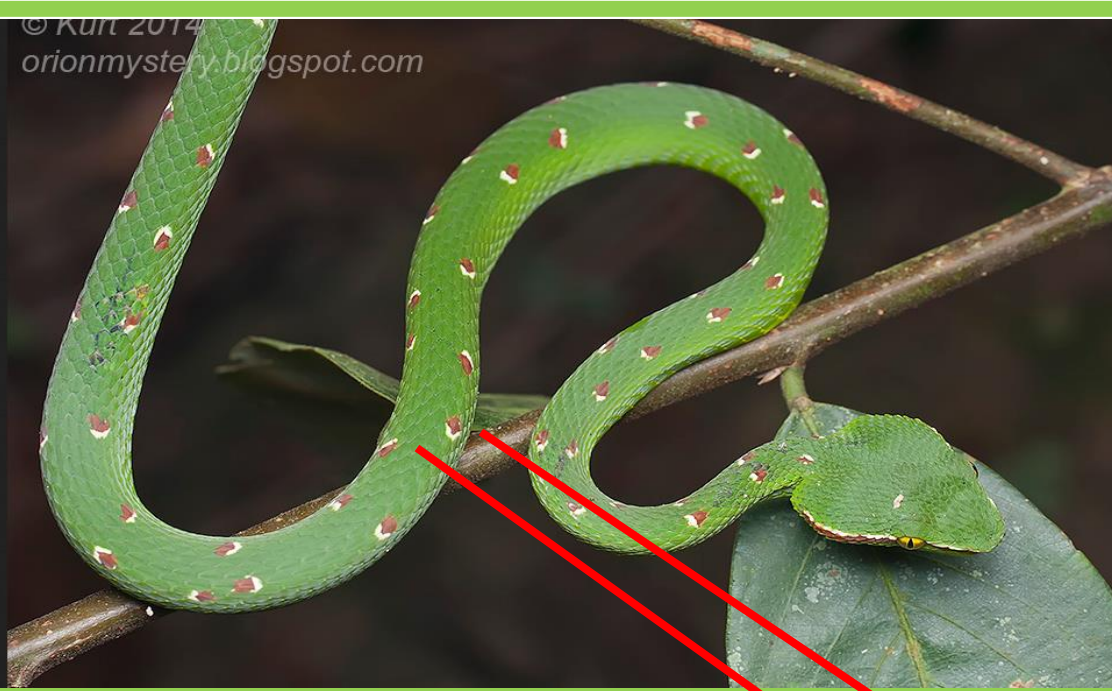


Asian pit viper (Crotalinae, Viperidae)

Females usually possess a black/green colouration on the dorsal part with alternating yellow bands



Juvenile or male-full green

With bicolour spots on the back

*Dissymmetry right/left
(spot/bands are not aligned)*

*Dissymmetry Up/down of the
spots (red can face white or red)*

Ontogenic shift in female

**Progenitor
spots ??**

Are the spot at the **pre-
pattern** at the origin of the
adult pattern?



THAILAND



© 2003 Thomas Jäkel

Captive-bred Thai juvenile female, 1 month old and about 19-20 cm long . Note the somewhat flat head, which becomes more voluminous when it grows.



© 2003 Thomas Jäkel

Same female 7 month old.



© 2004 Thomas Jäkel

15 month old (color appears different, because of flashlight)

Specimen monitoring over years (Thomas Jäkel)



© 2005 Thomas Jäkel

Thai female, 2 years old and about 40 cm long. The typical juvenile coloration is still dominant, but labial scales already show yellow and blue elements.



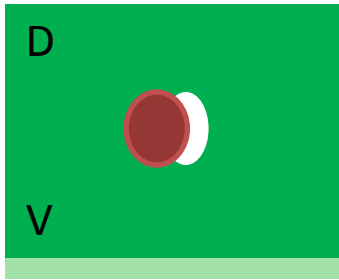
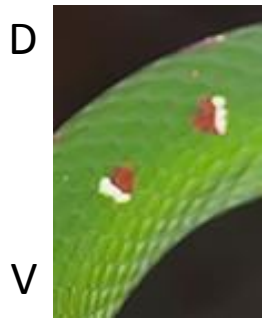
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32 month old. Change to the adult pattern starts in that red bars turn black in the middle and posterior part of the body. The head has become broader and bulkier. Like its siblings, this female has become increasingly aggressive, day and night, snapping at everything that appears to be prey and moves.

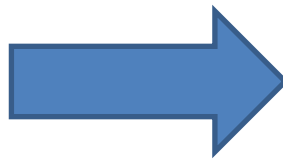


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3 years 3 months

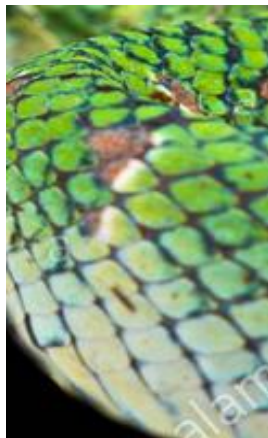
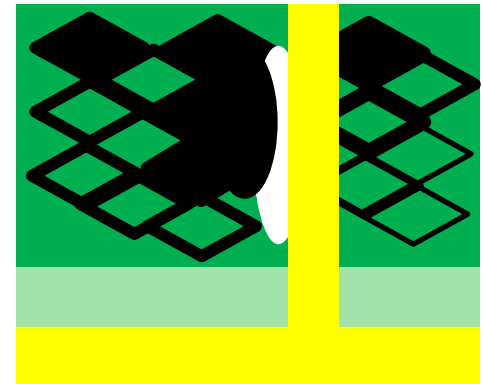
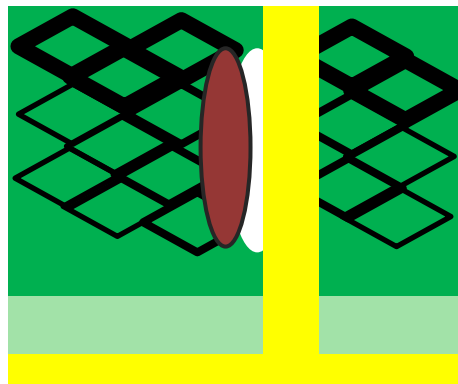
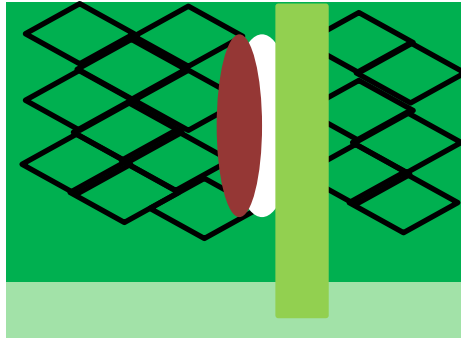


Male



Female

Time line of the ontogenic shift



Natural variation

Case of *T. laticinctus*

No difference between male and female, no ontogenic shift



T. wagleri



T. laticinctus

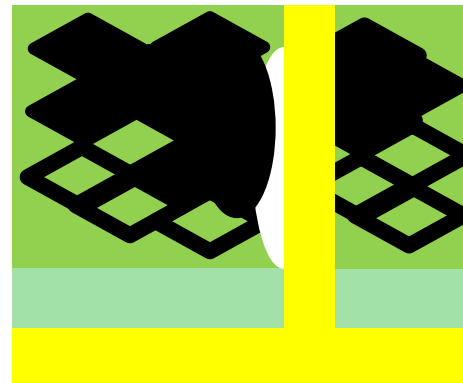
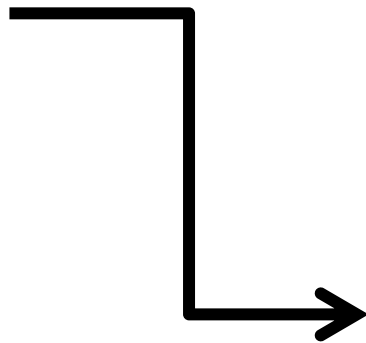
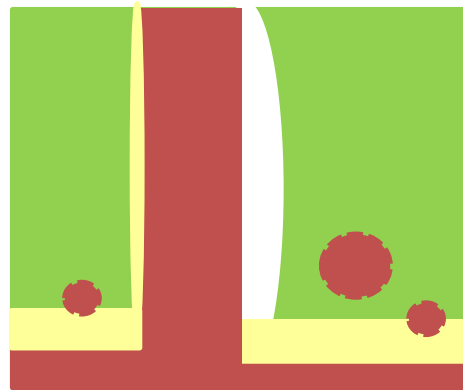
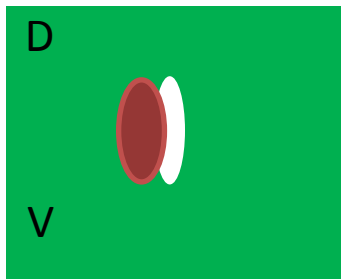
Case of *T. laticinctus*

No yellow ?

No melanin produced?

Red spot become a larger band

White spot becomes white band



T. subannulatus



*Red/white spots
elongated to
band size also in
male?
Female juvenile?*



Yellow overcomes the green?
No melanin produced?
Red/white spot turns green/blue?



Are spots the common precursors of all the repeated dorsal pattern found in snakes??

A new word
pitviper that
shows a spot
pattern similar to
T.wagleri juvenile.

Its closest relative
has a more
complex pattern
though.



Bothriopsis taeneata



*Bothriopsis
bilineata*

A common mechanism in Viperidae??



*Protobothrops
mucrosquamatus*
(Crotalinae)



©Rainer Fesse

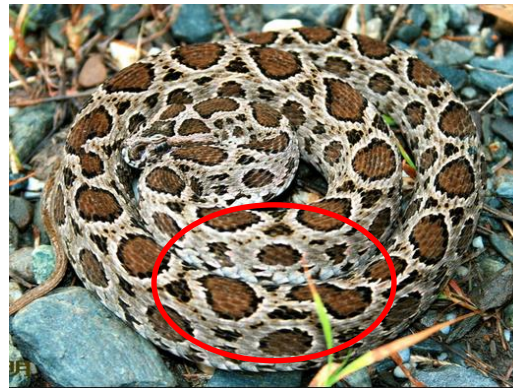
Similarly looking dorsal pattern



Vipera aspis
(Viperinae)

Daboia russelli
(Viperinae)

Dissymmetry
right/left



Bitis nasicornis (Viperinae)

A universal mechanism in snakes? Even for banded snakes



Lampropeltis californiae

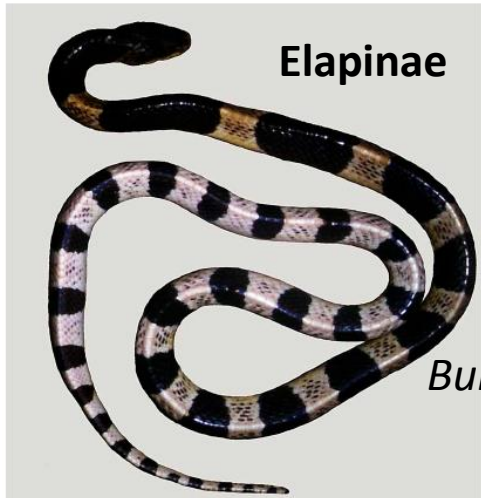


Lampropeltis triangulum

Dissymmetry right/left is universal in snakes



Morelia spilota
(Boidae)



Bungarus candidus

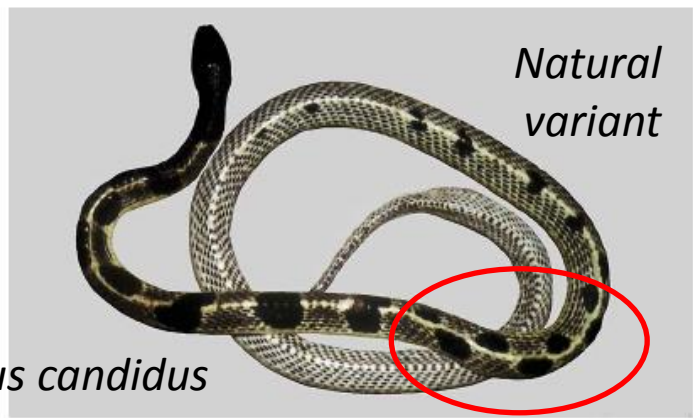


FIGURE 13. Adult female *Bungarus candidus* (UK B34) from the area of Losarang (Kabupaten Indramayu, West Java, Indonesia) with reduced black bands on the anterior body and mosaic-like dark stippling on the posterior body and tail. Photo by Ulrich Kuch.

FIGURE 11. Adult male *Bungarus candidus* (UK B36) from the area of Losarang (Kabupaten Indramayu, West Java, Indonesia) with reduced black bands on the posterior half of the body. Photo by Ulrich Kuch.

Bands and stripes linked?

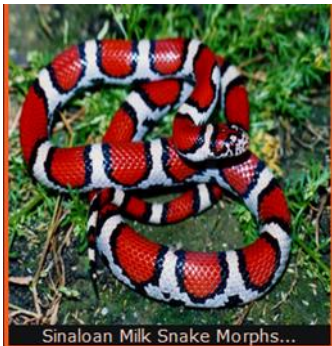
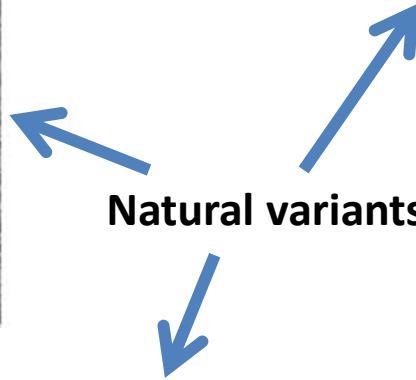


Lampropeltis californiae

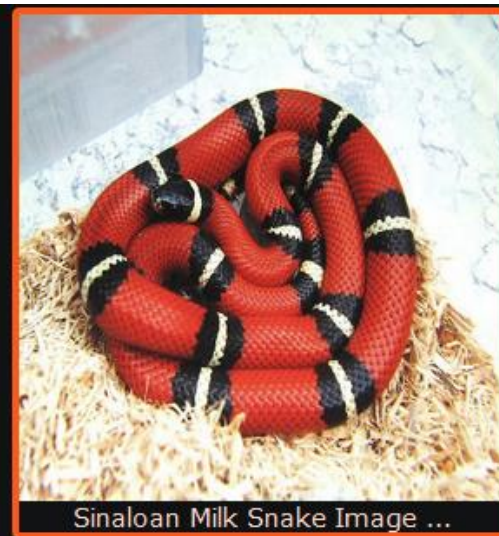
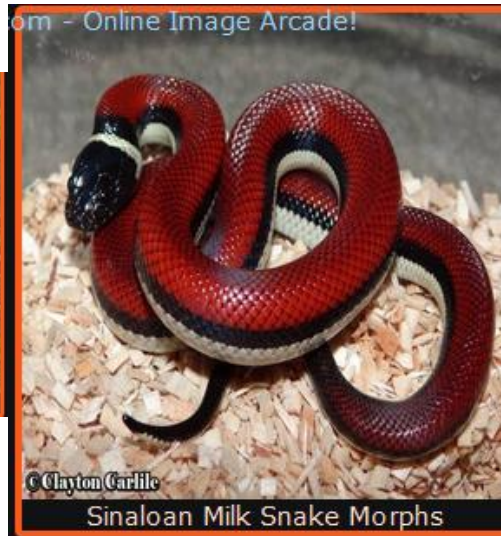


Bungarus fasciatus

Natural variants



**From bands to
spots to stripes...**



*Lampropeltis
triangulum
sinaloe*