



# Crayfish Identification

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Scott Van Egeren

# Today's Presentation

- Crayfish Regulations (Scott)
- Crayfish (Lindsey)
  - Key Terms
  - Anatomy
  - How to ID native crayfish using morphological features
  - General habitats of each species
  - Distribution of each species
  - Other species to look out for
- AIS Reporting (Maureen)

# Wisconsin Invasive Species Rule

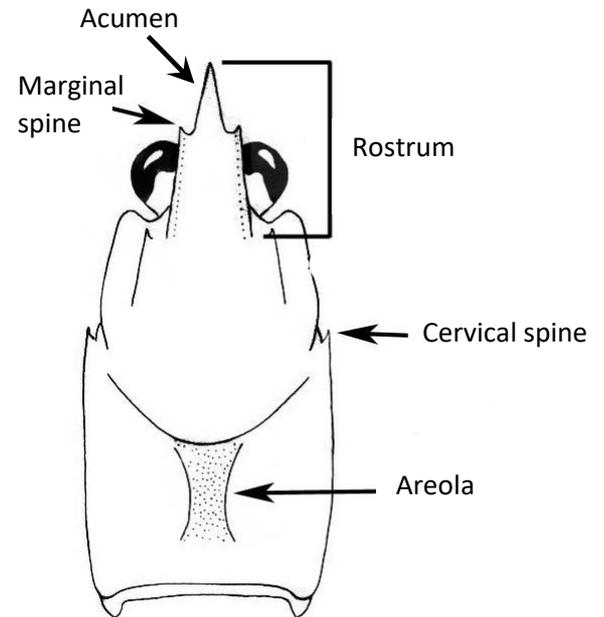
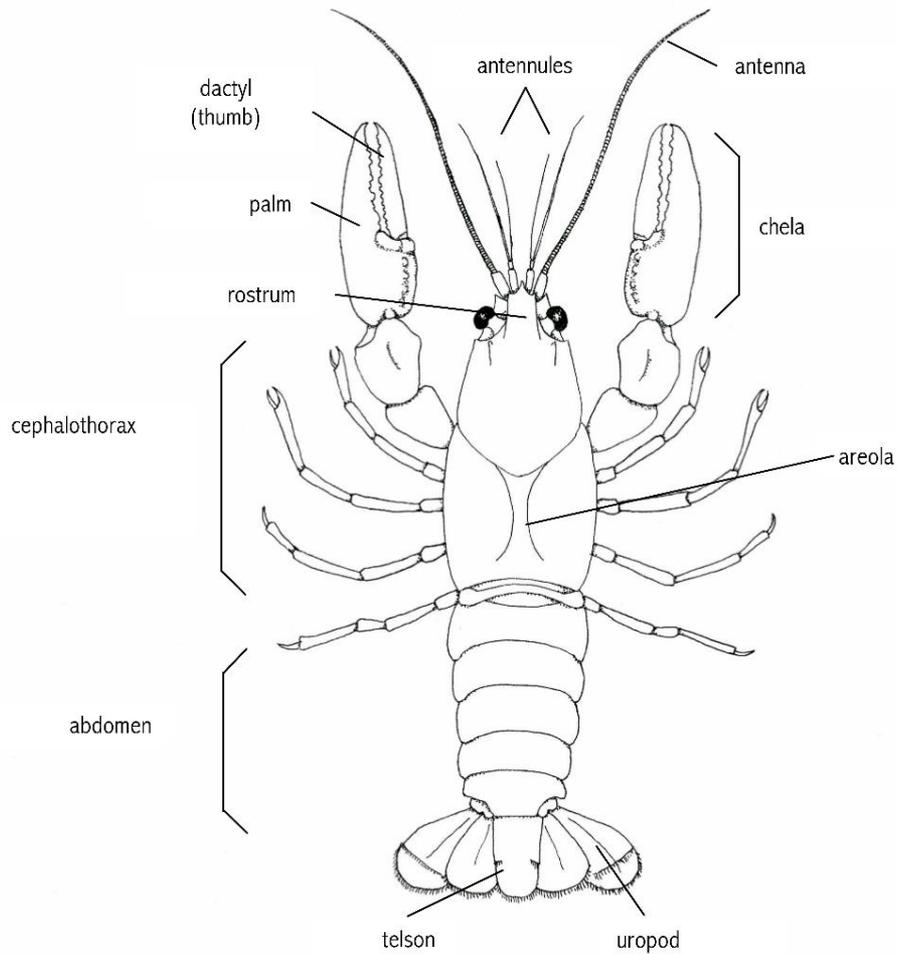
## NR 40

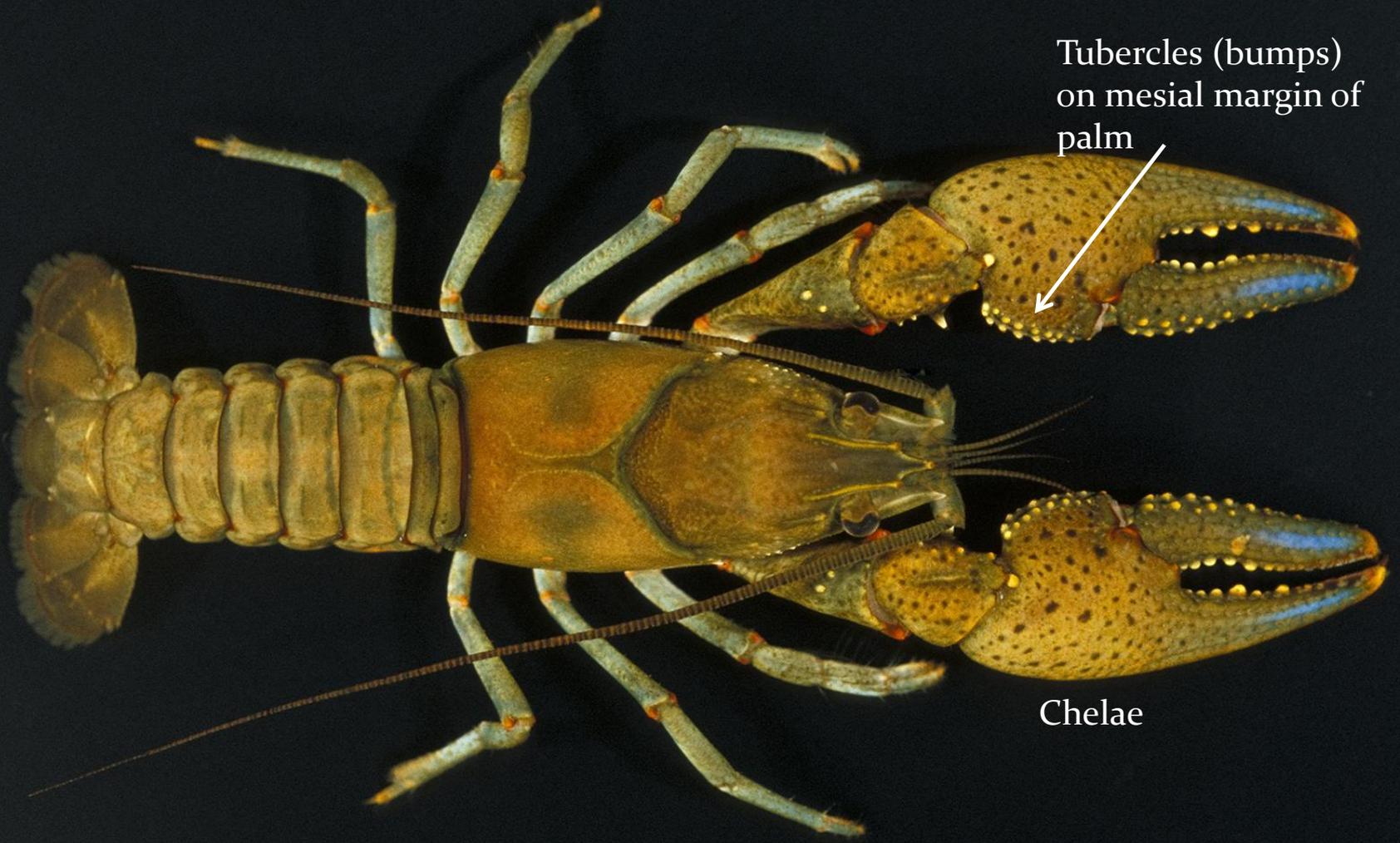
- Non-native crayfish can be incredibly invasive in natural ecosystems. Under Wis. Adm. Code s. NR 40.04(2)(c)(12), all non-native crayfish are prohibited species in Wisconsin. There is one exception, the rusty crayfish, which is considered an "established non-native crayfish" and classified as restricted.
- All **live** non-native crayfish **may not be transported, possessed, transferred (bought or sold) or introduced in Wisconsin** without a permit. DNR may grant an invasive species permit for educational or public display purposes.
- The only exception is that rusty crayfish taken from the Mississippi River may be used as bait on the Mississippi River.

# Crayfish Regulations

- Wild crayfish can be captured according to the rules as described in NR 19.27, which covers seasons, methods of harvest, and bag limits.
- A fishing license or small game license is required to collect or harvest crayfish from the wild by any person age 16 or older.
- It is not legal to possess hook & line fishing gear while in possession of live crayfish on any inland waters, except for the Mississippi River.
- If the crayfish is a prohibited non-native species, it must be immediately killed before a person can keep it.
- A bait dealer license is required to sell crayfish (live or dead) as bait for fishing

# Crayfish anatomy



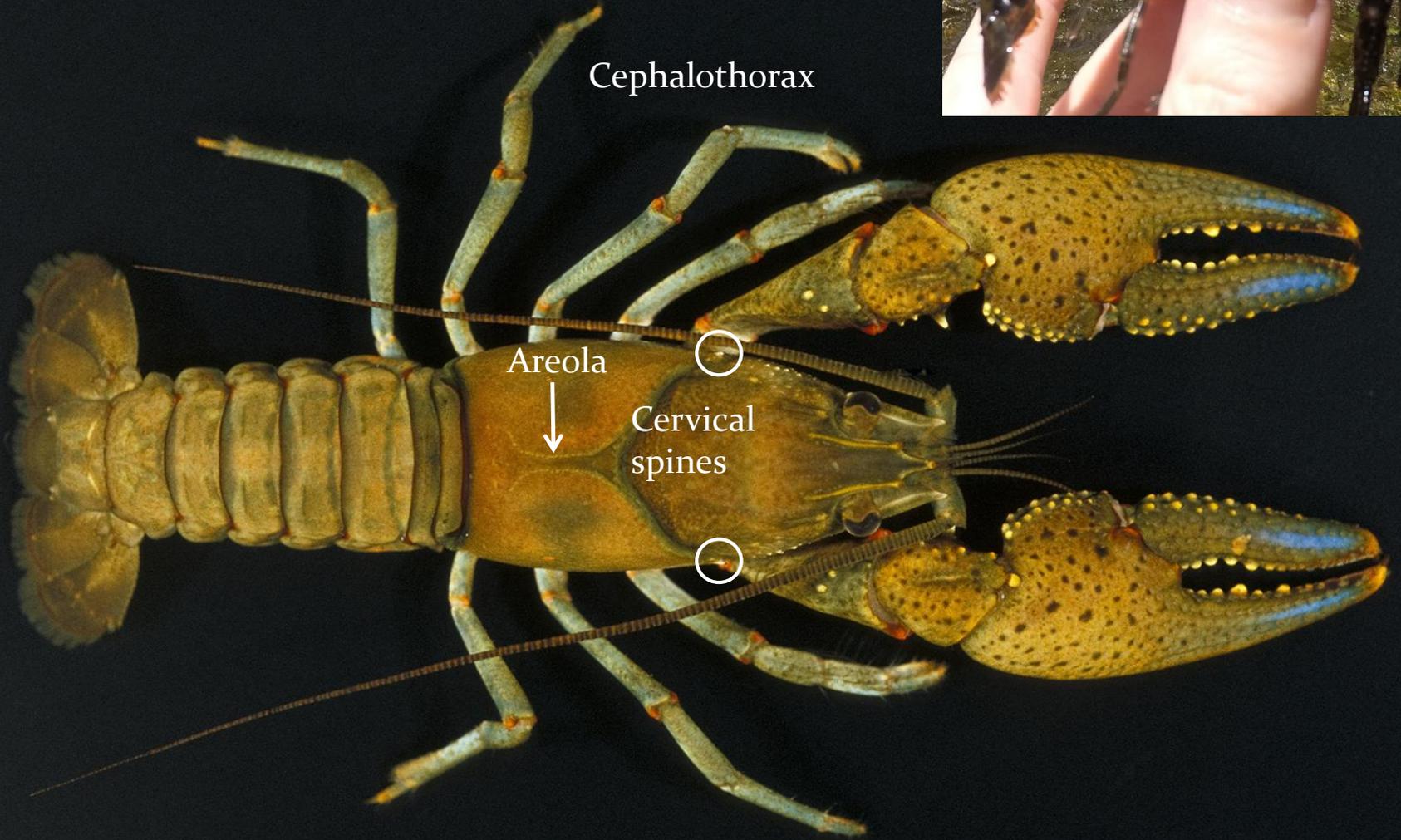


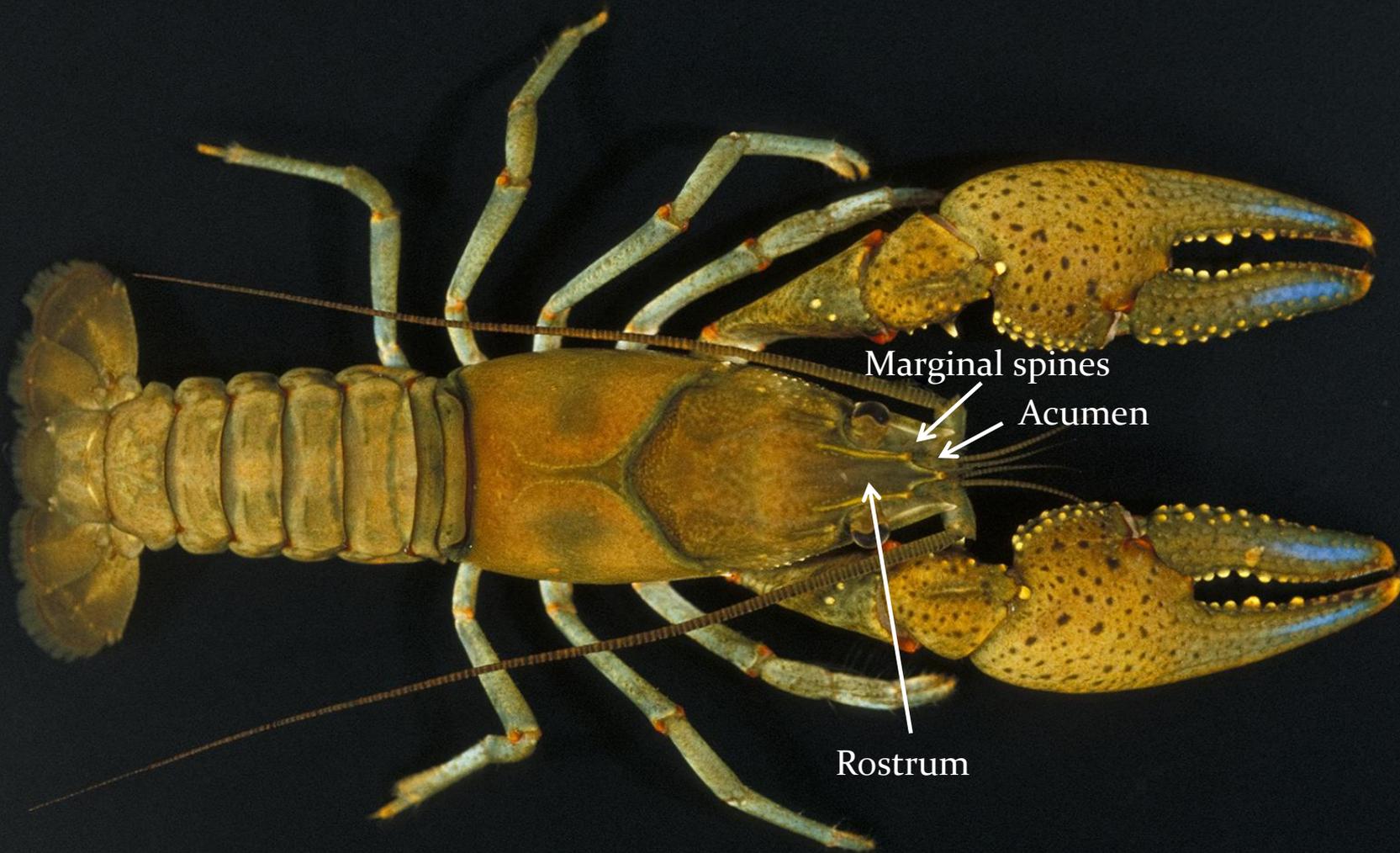
Tubercles (bumps)  
on mesial margin of  
palm

Chelae



Cephalothorax





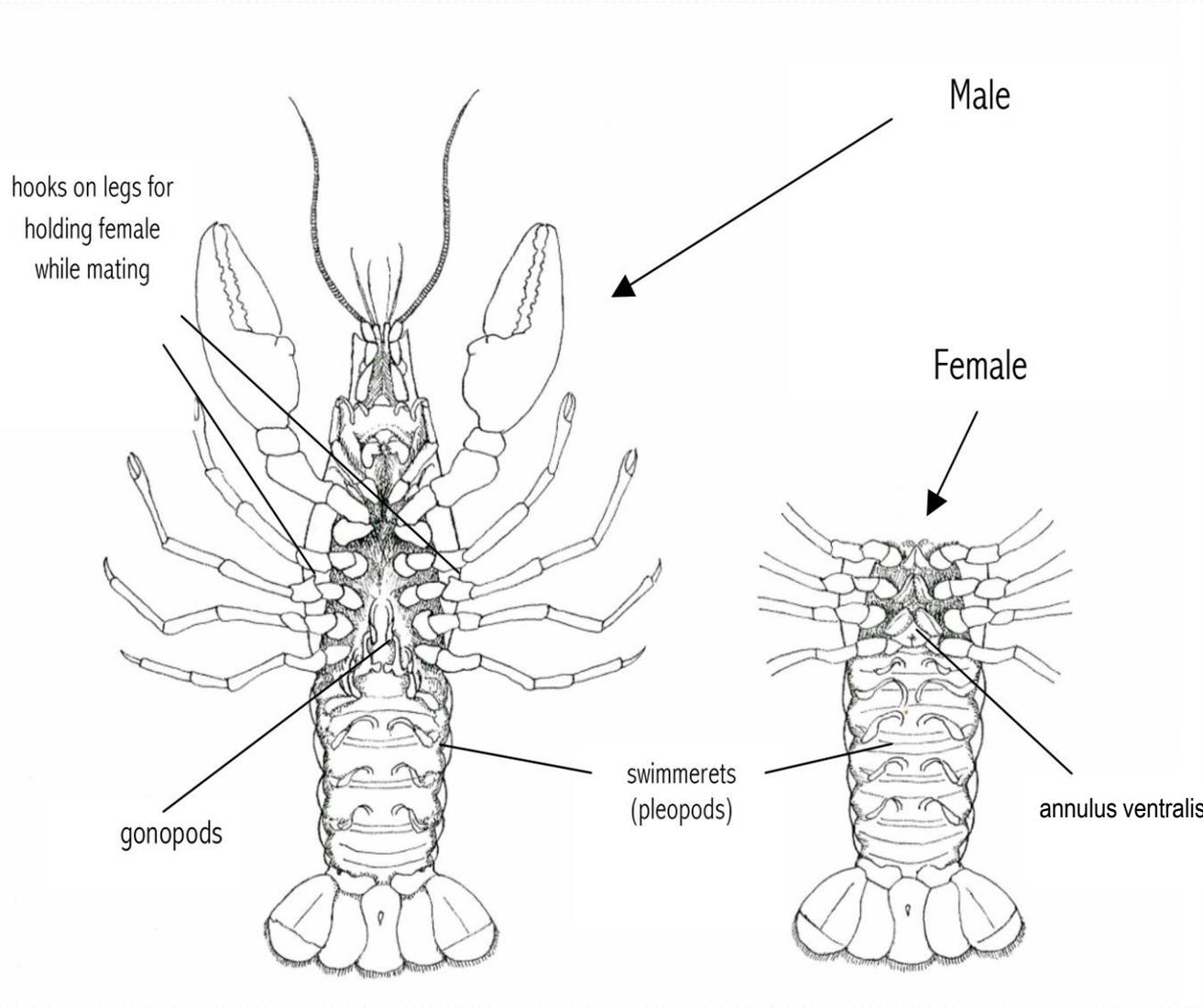
Marginal spines

Acumen

Rostrum



Abdomen







Lateral view

# Color and color pattern

- Crayfish within the same species can vary in color
- However, the presence of a color pattern can be a good indicator

Astaxanthin-free carp feed  
with 30% protein



Astaxanthin-rich discus feed  
with 20 % shrimps and 46 % protein



Marbled crayfish fed different diets

# Color and color pattern



Rusty crayfish

# Color and color pattern



Northern  
clearwater  
crayfish



# Species

## Faxonius (previously Orconectes)

- Calico crayfish (*Faxonius immunis*) native
- Virile crayfish (*Faxonius virilis*) native
- Northern clearwater crayfish (*Faxonius propinquus*) native
- Rusty crayfish (*Faxonius rusticus*) **invasive**

## Procambarus

- White river crayfish (*Procambarus acutus*) native
- Red swamp crayfish (*Procambarus clarkii*) **invasive**
- Marbled crayfish (*Procambarus virginalis*) **invasive**
- Prairie crayfish (*Procambarus gracilis*) native

## Cambarus

- Devil crayfish (*Cambarus diogenes*) native

Examples of terminal elements of gonopods of these genera



MI



MII



MI



MII



MI



MII



*Procambarus*



*Cambarus*



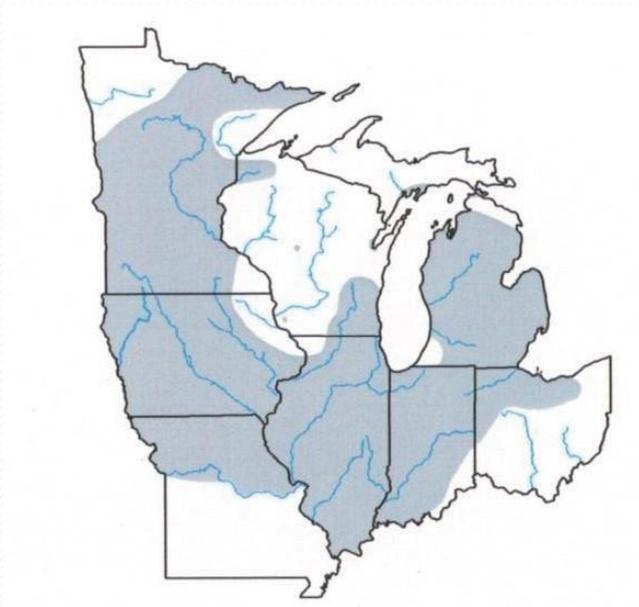
*Faxonius*

MI= Form one male MII= Form two male

# Calico crayfish

(*Faxonius immunis*)

- Native to Wisconsin
- Found in no flow or slow flow habitats with soft substrate and usually containing vegetation
- Both permanent and temporary waterbodies



# Calico crayfish (*Faxonius immunis*)

## Rostrum

- Margins slightly convex
- Marginal spines small or absent

## Cephalothorax

- Areola narrow
- Cervical spine present

## Chelae

- Chelae large
- Deep incision at the base of the moveable finger\*
- Two rows of tubercles on mesial margin of palm (6 – 8 tubercles in the row)

## Reproductive organs

- Gonopod with two long elements that curve away from the body

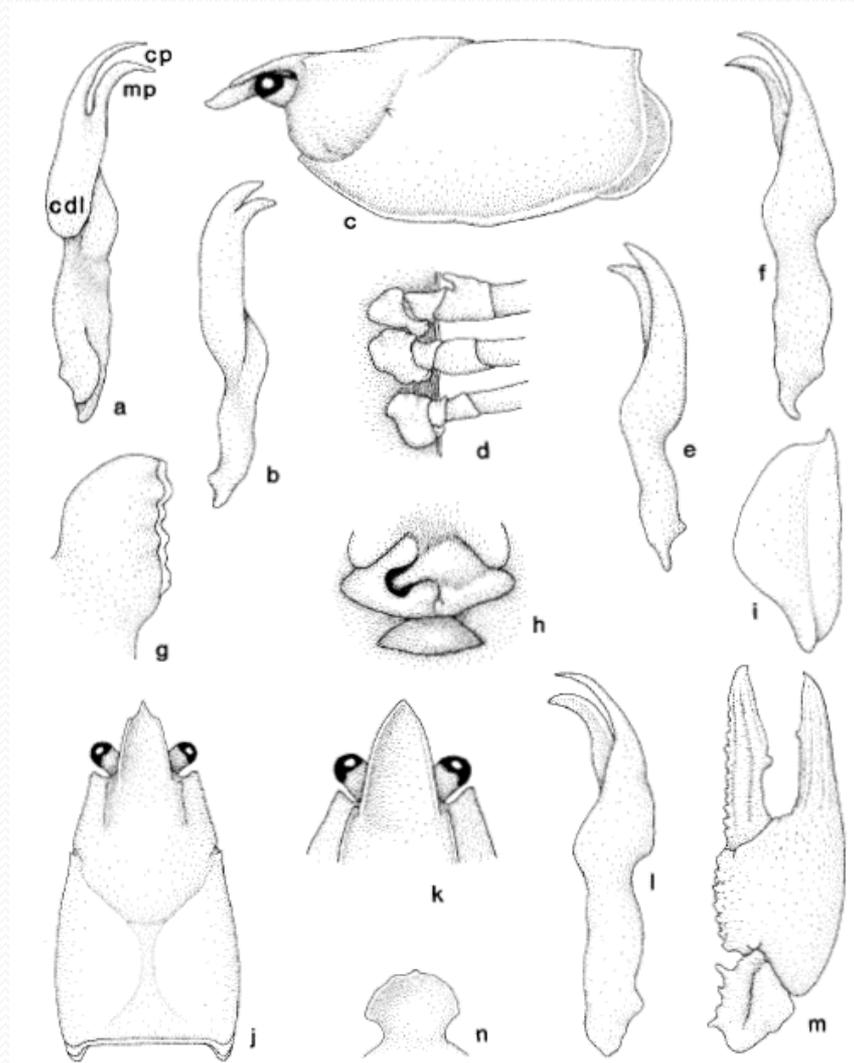


Figure 32. *Orconectes (G.) immunis* (b, c, second form male Otter Creek, Rock County; h, female also from Otter Creek; l, first form male Birch Isle Lake, Burnett County; all others first form male from Allen Creek in Jefferson County): a, b, mesial view of first pleopod; c, lateral view of carapace; d, proximal podomeres of third, fourth, and fifth pereopods; e, f, lateral view of first pleopod; g, incisor margin of right mandible; h, annulus ventralis; i, antennal scale; j, dorsal view of carapace; k, dorsal view of anterior portion of carapace; l, dorsal view of distal podomeres of cheliped; m, dorsal view of distal podomeres of cheliped; n, epistome; cp, central projection; mp, mesial projection; cdl, condyl.

# Calico crayfish (*Faxonius immunis*)

## Rostrum

- Margins slightly convex
- Marginal spines small

## Cephalothorax

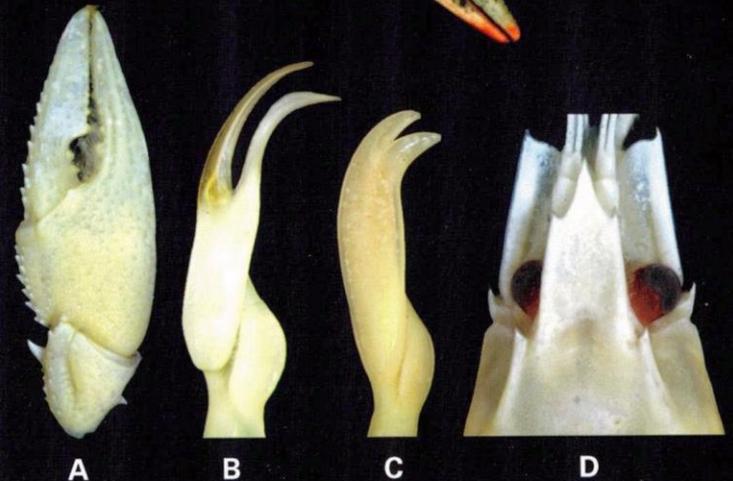
- Areola narrow
- Cervical spine present

## Chelae

- Chelae large
- Deep incision at the base of the moveable finger\*
- Two rows of tubercles on mesial margin of palm (6 – 8 tubercles in the row)

## Reproductive organs

- Gonopod with two long elements that curve away from the body



# Calico crayfish (*Faxonius immunis*)

## Color

- Tips of fingers red or orange



# Virile crayfish (*Faxonius virilis*)

- Native to Wisconsin, invasive elsewhere
- Found in permanent lakes and streams
- Common in rocky substrate or aquatic vegetation



# Virile crayfish (*Faxonius virilis*)

## Rostrum

- Margins straight
- Marginal spines present

## Cephalothorax

- Areola narrow
- Cervical spine present

## Chelae

- Chelae large
- Two rows of large tubercles on mesial margin of palm (5 – 7 tubercles in the row)

## Reproductive organs

- Gonopod with two moderately long elements, that both curve slightly away from the body, one distinctly shorter than the other

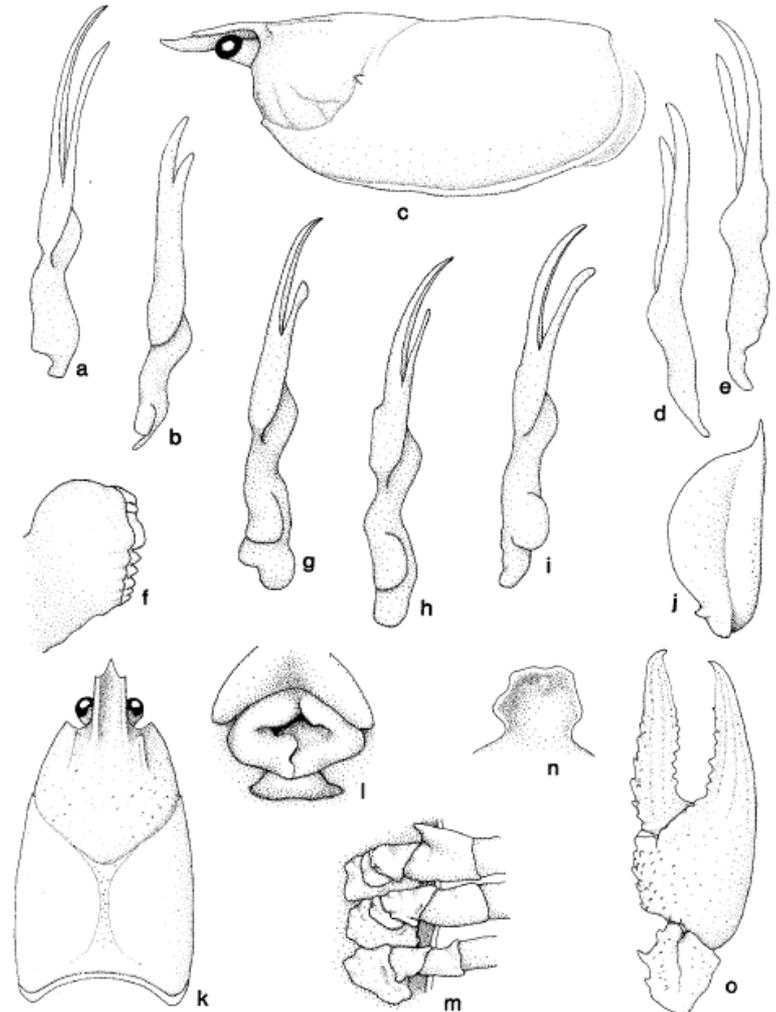


Figure 52. *Orconectes (G.) virilis* (b,d, second form male Lake Noquebay, Marinette County; g, first form male Sheboygan River, Sheboygan County; h, first form male Upper Vermillion Lake, Barron County; i, first form male South Fork Main Creek, Rusk County; l, adult female Crawfish River, Columbia County; all others first form male Eau Claire Lake at Mooney Dam Park, Douglas County); a,b,g,h,i, mesial view of first pleopod; c, lateral view of carapace; d,e, lateral view of first pleopod; f, incisor margin of right mandible; j, antennal scale; k, dorsal view of carapace; l, annulus ventralis; m, proximal podomeres of third, fourth, and fifth pereopods; n, epistome; o, dorsal view of distal podomeres of cheliped.

# Virile crayfish (*Faxonius virilis*)

## Rostrum

- Margins straight
- Marginal spines present

## Cephalothorax

- Areola narrow
- Cervical spine present

## Chelae

- Chelae large
- Two rows of large tubercles on mesial margin of palm (5 – 7 tubercles in the row)

## Reproductive organs

- Gonopod with two moderately long elements, that both curve slightly away from the body, one distinctly shorter than the other



A



B



C



D

# Virile crayfish (*Faxonius virilis*)

## Color

- Tips of fingers orange
- Paired blotches extending along the abdomen



# Northern clearwater crayfish (*Faxonius propinquus*)

- Native to some regions of Wisconsin
- Found in permanent lakes and streams, typically prefers rocky substrate



# Northern clearwater crayfish (*Faxonius propinquus*)

## Rostrum

- Margins straight or slightly concave
- Marginal spines present
- Ridge in center of rostrum

## Cephalothorax

- Areola wide
- Cervical spine present

## Chelae

- Chelae large
- Two rows of tubercles on mesial margin of palm (7 – 10 tubercles in the row)

## Reproductive organs

- Gonopod with two straight short elements, typically close to the same length

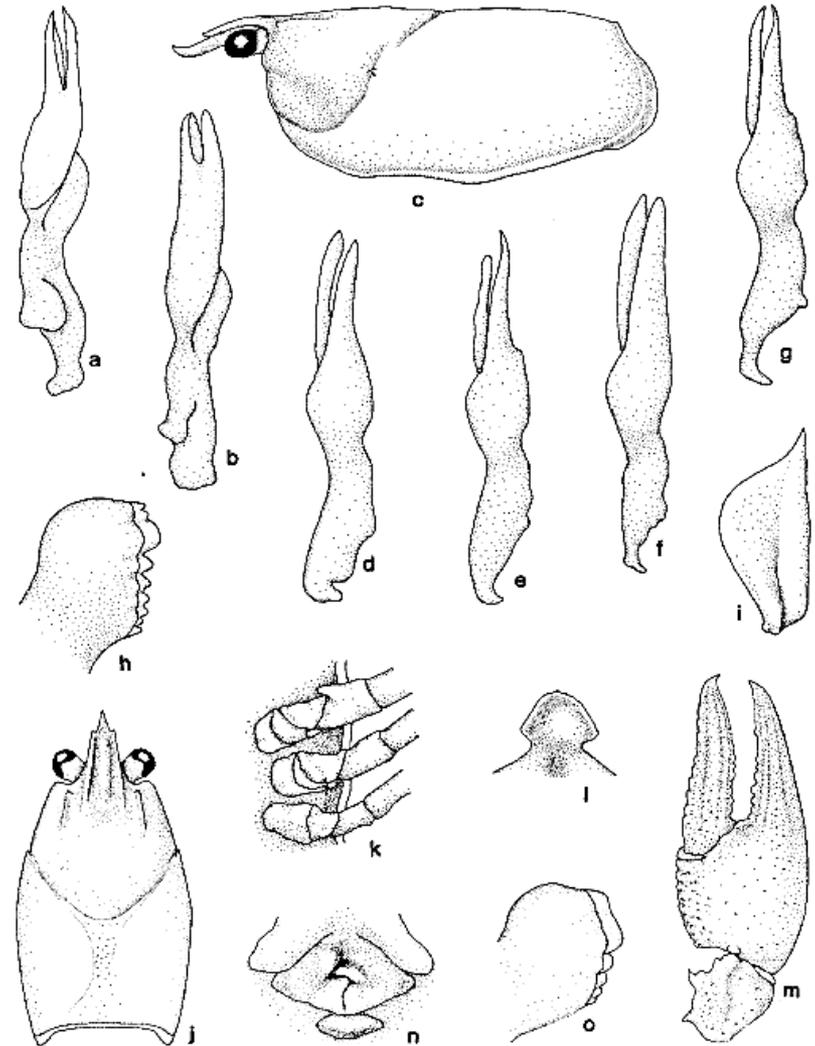


Figure 36. *Oromoctes (C.) propinquus* (a, g, from first form male from Little Lake on Washington Island, Door County; d, from first form male from East Twin River, Kewaunee County; o, from first form male from Branch River, Manitowoc County; n, from adult female from Allen Creek, Rock County; b, f, from second form male from Allen Creek; all others from first form male also from Allen Creek); a, b, mesial view of first pleopod; c, lateral view of carapace; d-g, lateral view of first pleopod; h, o, incisor margin of right mandible; i, antennal scale; j, dorsal view of carapace; k, proximal podomeres of third, fourth, and fifth pereopods; l, epistome; m, dorsal view of distal podomeres of cheliped; n, annulus ventralis.

# Northern clearwater crayfish (*Faxonius propinquus*)

## Rostrum

- Margins straight or slightly concave
- Marginal spines present
- Ridge in center of rostrum

## Cephalothorax

- Areola wide
- Cervical spine present

## Chelae

- Chelae large
- Two rows of tubercles on mesial margin of palm (7 – 10 tubercles in the row)

## Reproductive organs

- Gonopod with two straight short elements, typically close to the same length



# Northern clearwater crayfish (*Faxonius propinquus*)

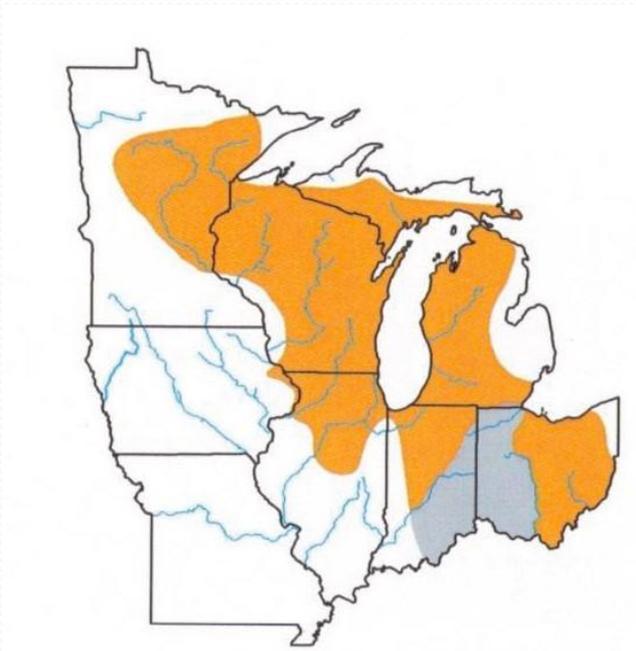
## Color

- Dark brown stripe on abdomen
- Tips of fingers red or orange with black bands (only other crayfish in WI with black bands is rusty)



# Rusty crayfish (*Faxonius rusticus*)

- Invasive in Wisconsin, common throughout the state
- Found in permanent lakes and streams, typically prefers rocky substrate



# Rusty crayfish (*Faxonius rusticus*)

## Rostrum

- Margins curved and concave
- Marginal spines present

## Cephalothorax

- Areola moderately wide
- Cervical spine present

## Chelae

- Chelae large
- Two rows of small tubercles on mesial margin of palm (6 – 8 tubercles in the row)

## Reproductive organs

- Gonopod with two straight or slightly curved, moderately long elements, one slightly shorter than the other
- Shoulder on gonopod (if breeding form)

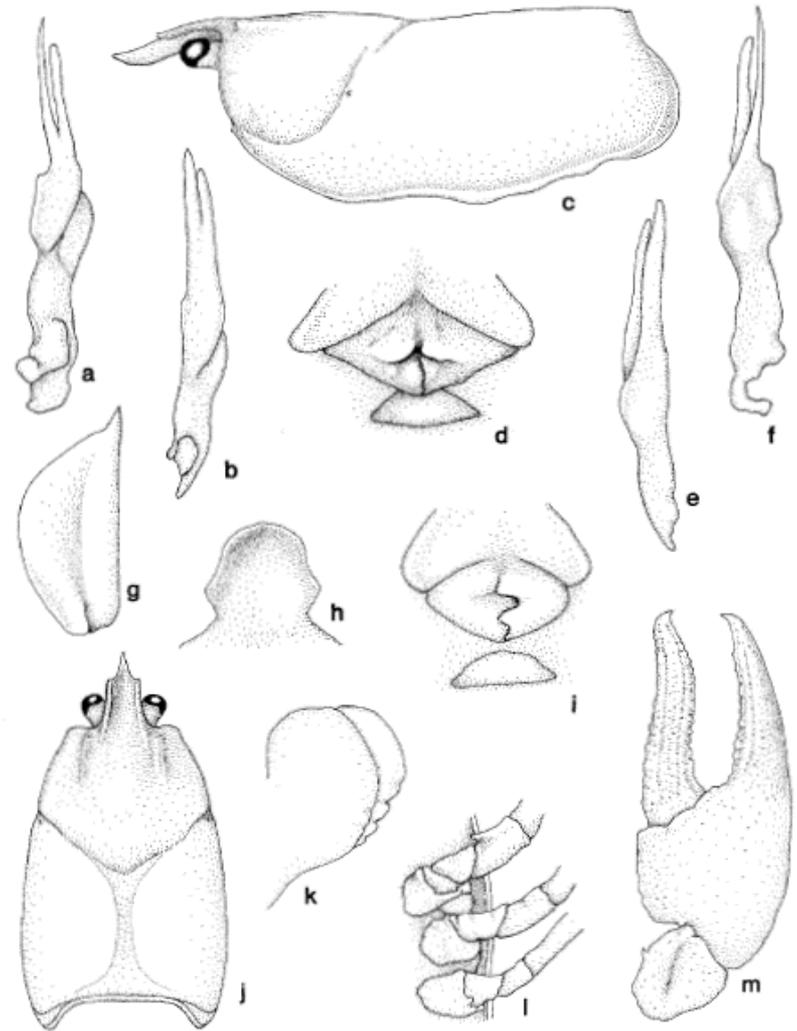


Figure 46. *Onconectes (P.) rusticus* (d, adult female Silver Lake, Forest County; i, juvenile female South Turtle Lake, Vilas County; b, e, second form male Lake Metonga, Forest County; all others first form male from Lake Metonga, Forest County): a, b, mesial view of first pleopod; c, lateral view of carapace; d, i, annulus ventralis; e, f, lateral view of first pleopod; g, antennal scale; h, epistome; j, dorsal view of carapace; k, incisor margin of right mandible; l, proximal podomeres of third, fourth, and fifth pereiopods; m, dorsal view of distal podomeres of cheliped.

# Rusty crayfish

## (*Faxonius rusticus*)

### Rostrum

- Margins curved and concave
- Marginal spines present

### Cephalothorax

- Areola moderately wide
- Cervical spine present

### Chelae

- Chelae large
- Two rows of small tubercles on mesial margin of palm (6 – 8 tubercles in the row)

### Reproductive organs

- Gonopod with two straight or slightly curved, moderately long elements, one slightly shorter than the other
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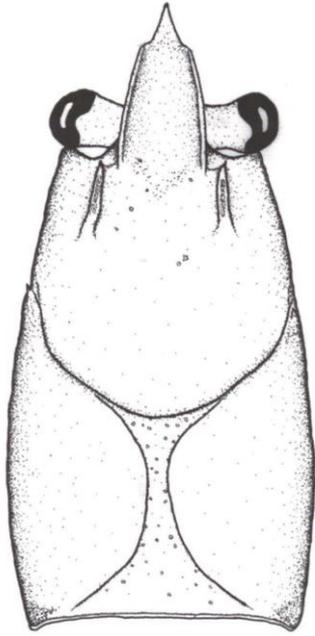
# Rusty crayfish (*Faxonius rusticus*)

## Color

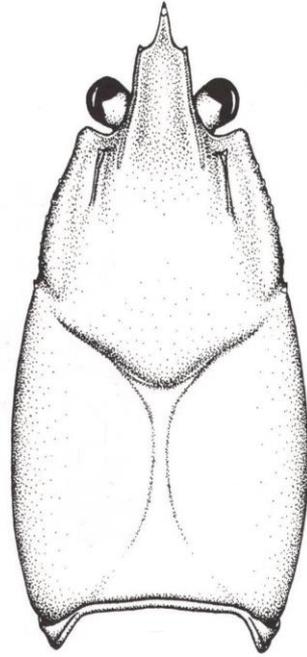
- Tips of fingers red or orange with black bands (only other crayfish in WI with black bands is northern clearwater)
- Rusty or brown colored spot on the side of the carapace
- Top forward edge of abdominal segments with red band



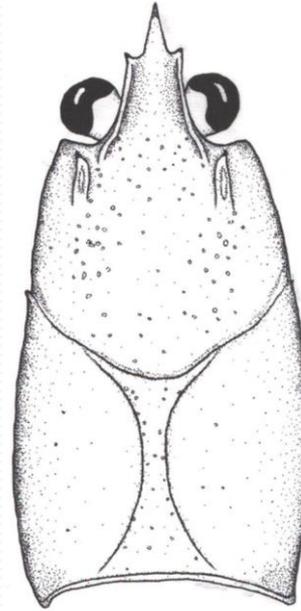
calico



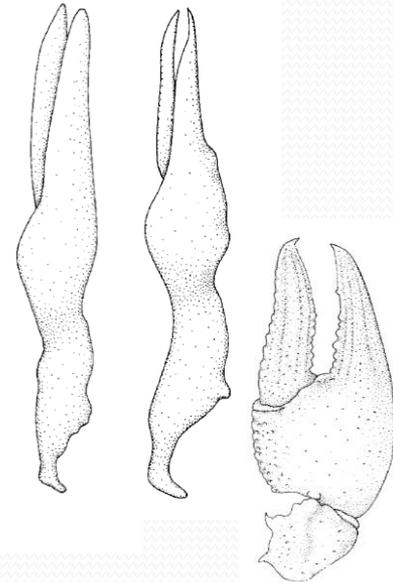
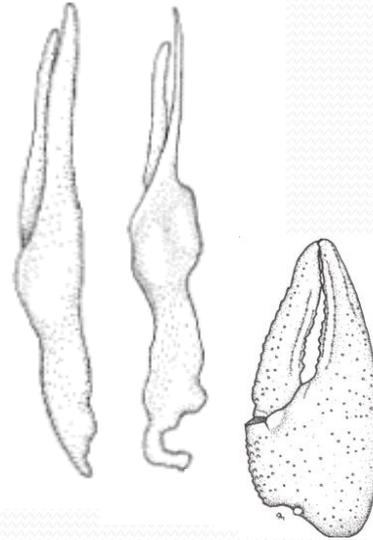
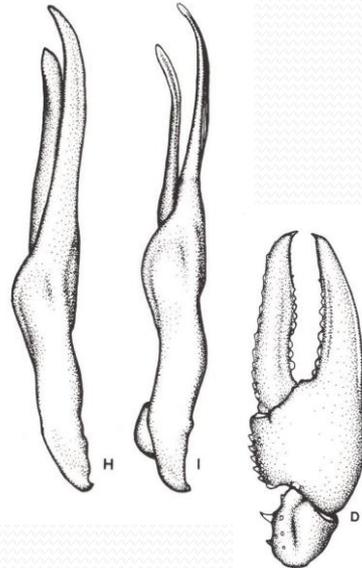
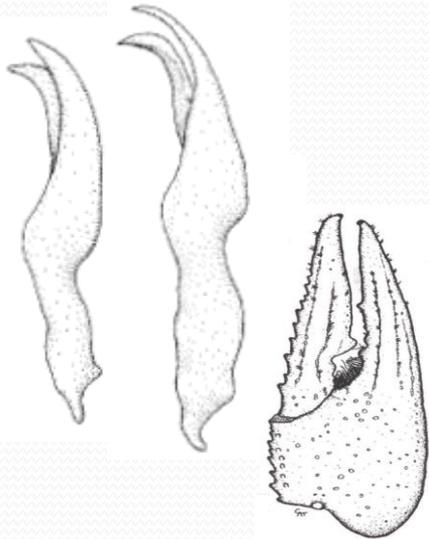
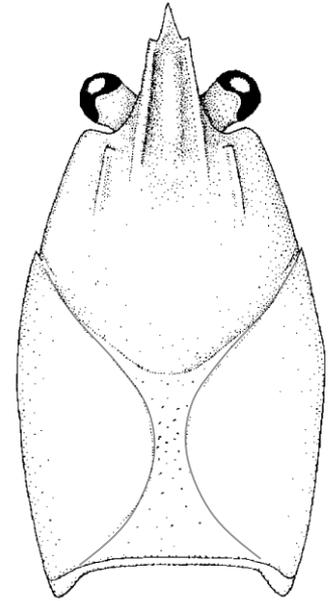
virile



rusty



northern clearwater



# Species

## Faxonius (previously Orconectes)

- Calico crayfish (*Faxonius immunis*) native
- Virile crayfish (*Faxonius virilis*) native
- Northern clearwater crayfish (*Faxonius propinquus*) native
- Rusty crayfish (*Faxonius rusticus*) **invasive**

## Procambarus

- White river crayfish (*Procambarus acutus*) native
- Red swamp crayfish (*Procambarus clarkii*) **invasive**
- Marbled crayfish (*Procambarus virginalis*) **invasive**
- Prairie crayfish (*Procambarus gracilis*) native

## Cambarus

- Devil crayfish (*Cambarus diogenes*) native

Examples of terminal elements of gonopods of these genera



MI



MII



MI



MII



MI



MII



*Procambarus*



*Cambarus*

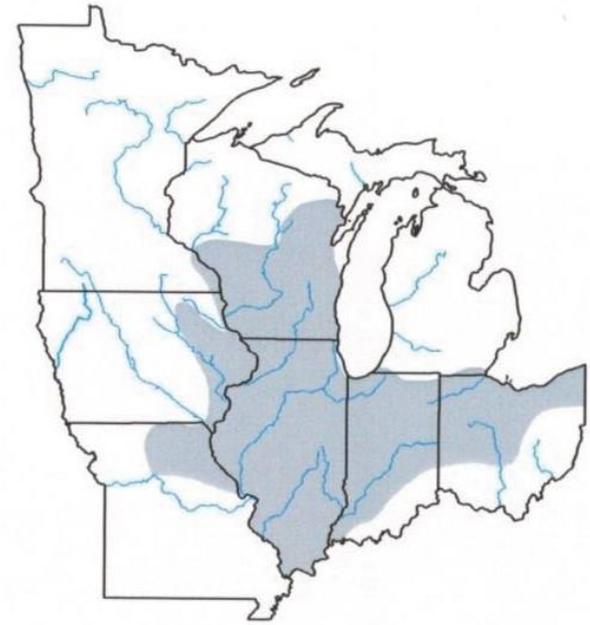


*Faxonius*

MI= Form one male MII= Form two male

# White river crayfish (*Procambarus acutus*)

- Native in Wisconsin
- Typically found in waters with no flow or slow flow with silt or muck substrate
- Found in temporary and permanent waters
- Burrows during dry periods, no chimney



# White river crayfish (*Procambarus acutus*)

## Rostrum

- Short acumen
- Rostrum triangle shaped
- Marginal spines small or absent

## Cephalothorax

- Areola narrow or very narrow, but open\*
- Carapace covered with small tubercles
- Cervical spine present

## Chelae

- Chelae long and thin
- One row of tubercles on mesial margin of palm (8 – 9 tubercles)

## Reproductive organs

- Gonopod ends in four short elements, that curve laterally from the midline\*

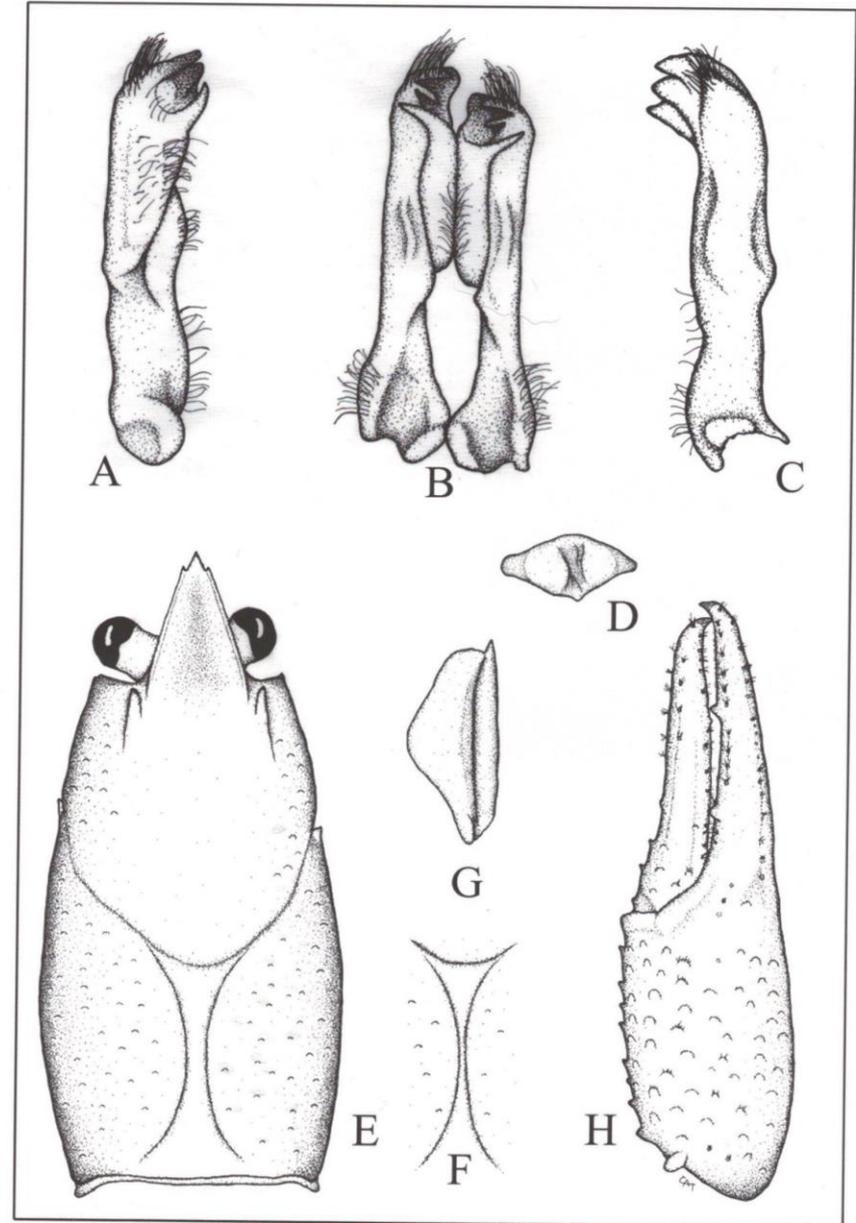


Fig. 173. *Procambarus acutus*: A, mesial view of form I gonopod; B, ventral view of form I gonopods; C, lateral view of form II gonopod; D, ventral view of annulus ventralis; E, dorsal view of carapace; F, dorsal view of areola; G, dorsal view of right antennal scale; H, dorsal view of right chela.

# White river crayfish (*Procambarus acutus*)

## Rostrum

- Short acumen
- Rostrum triangle shaped
- Marginal spines small or absent

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- Areola narrow or very narrow, but open\*
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## Chelae

- Chelae long and thin
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## Reproductive organs

- Gonopod ends in four short elements, that curve laterally from the midline\*



A

B

C

D

# White river crayfish (*Procambarus acutus*)

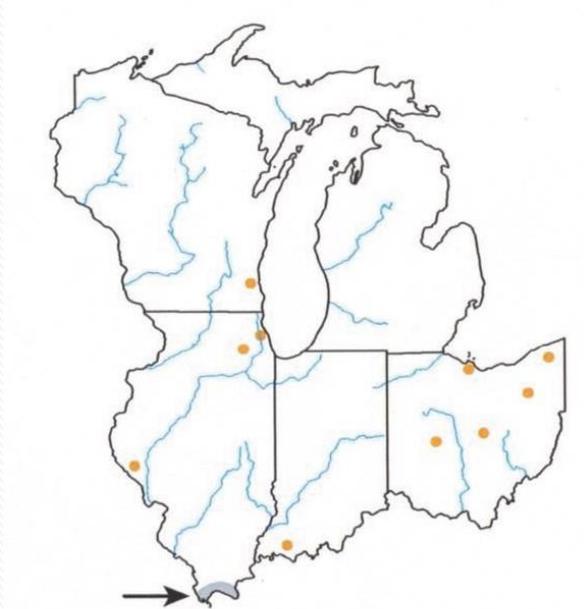
## Color

- Large adults are typically dark red with cream-colored tubercles, some individuals are light brown or grey and mottled with dark spots
- Black stripe on abdomen
- No distinct color on the tips of the fingers



# Red swamp crayfish (*Procambarus clarkii*)

- Invasive in Wisconsin, currently uncommon
- Found in both permanent and temporary waterbodies, commonly with sand or mud substrate
- Wetlands, streams, lakes
- Burrows during the winter or to escape drying, chimneys sometimes present



# Red swamp crayfish (*Procambarus clarkii*)

## Rostrum

- Short acumen
- Rostrum triangle shaped
- Marginal spines present

## Cephalothorax

- Areola closed at the midpoint\*
- Carapace covered with small tubercles
- Cervical spine present

## Chelae

- Chelae long and thin
- One row of tubercles on mesial margin of palm (7 tubercles)

## Reproductive organs

- Gonopod ends in four short elements, not curved laterally from the midline\*
- Prominent shoulder present on gonopod (if breeding form)

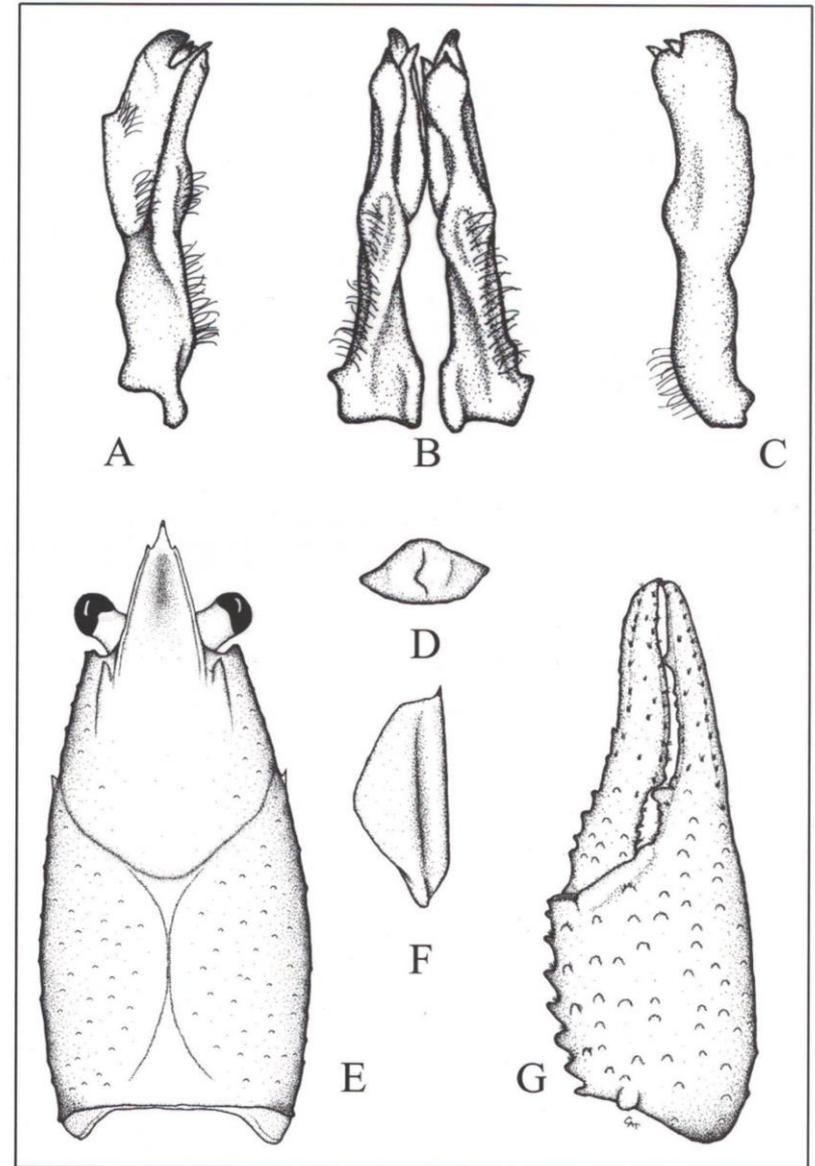


Fig. 176. *Procambarus clarkii*: A, mesial view of form I gonopod; B, ventral view of form I gonopods; C, lateral view of form II gonopod; D, ventral view of annulus ventralis; E, dorsal view of carapace; F, dorsal view of right antennal scale; G, dorsal view of right chela.

# Red swamp crayfish (*Procambarus clarkii*)

## Rostrum

- Short acumen
- Rostrum triangle shaped
- Marginal spines present

## Cephalothorax

- Areola closed at the midpoint\*
- Carapace covered with small tubercles
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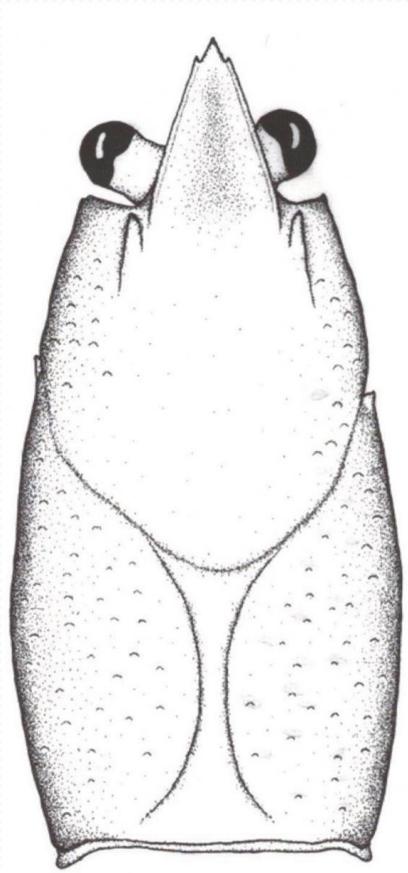
# Red swamp crayfish (*Procambarus clarkii*)

## Color

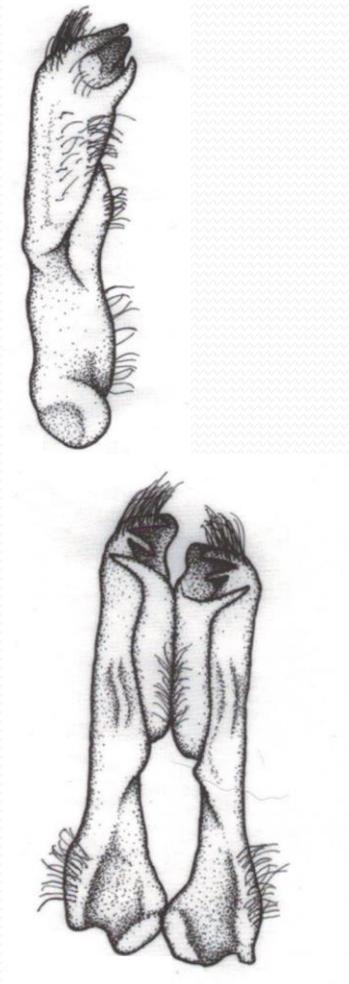
- Large adults are typically dark red, some smaller individuals are light brown or grey and mottled with dark spots
- Black stripe on abdomen
- Blue stripe on underside of abdomen\*
- No distinct color on the tips of the fingers
- Chelae dark red and covered in red or orange tubercles in adults



White river

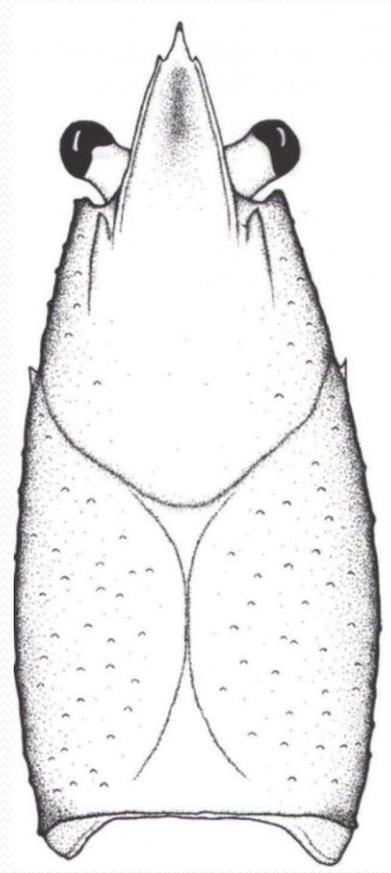


Areola open



Gonopods curved at the ends

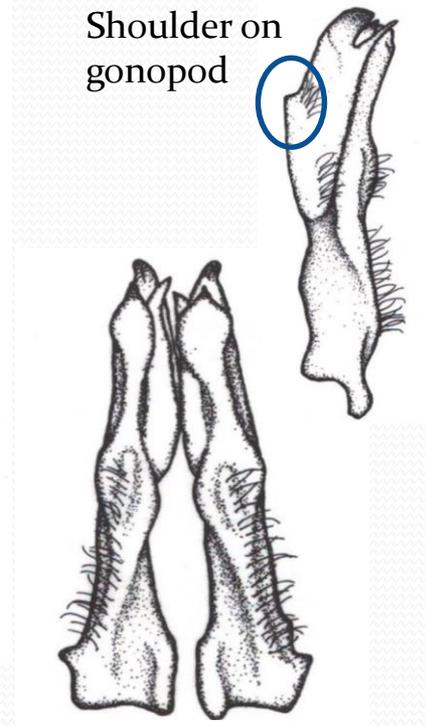
Red swamp



Areola closed



Shoulder on gonopod



Gonopods straight

# Marbled crayfish

(*Procambarus virginalis*)

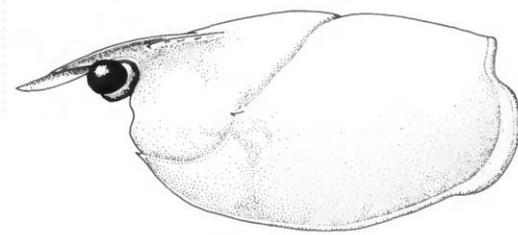
- Invasive, not currently present in Wisconsin
- Established populations in Germany, Austria, Italy, the Netherlands, the UK, Japan and Madagascar.
- Triploid, reproduces through parthenogenesis (genetically identical, all females)
- Close relative of the slough crayfish that is native to FL and GA
- Found in flowing and non-flowing habitats, abundant in vegetation
- Constructs burrows to escape drying



# Marbled crayfish (*Procambarus virginalis*)

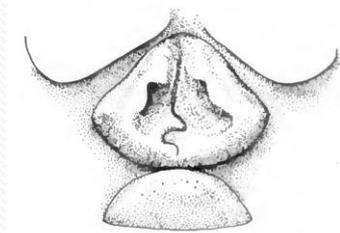
## Rostrum

- Rostrum flat, triangle shaped, acumen short
- Marginal spines present



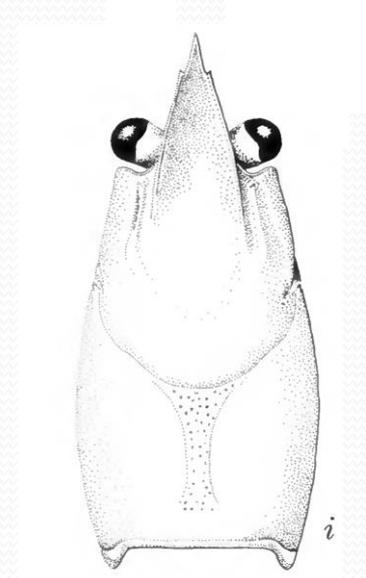
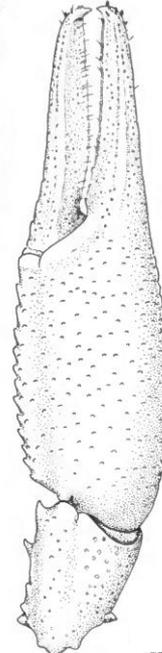
## Cephalothorax

- Areola narrow
- Cervical spine present



## Chelae

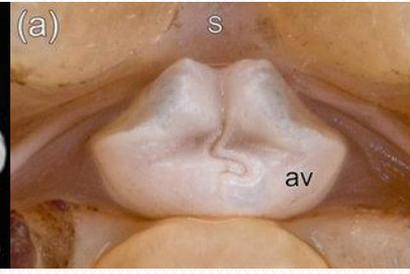
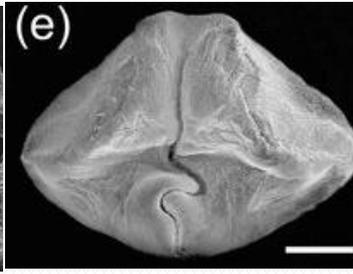
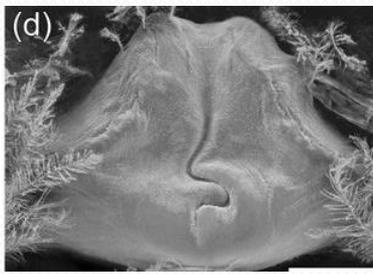
- Long, thin chelae
- One row of tubercles on mesial margin of palm (8 -14 tubercles)



## Reproductive organs

- Marbled crayfish are all females
- Annulus ventralis bellshaped

# Marbled crayfish (*Procambarus virginalis*)



## Rostrum

- Rostrum flat, triangle shaped, acumen short
- Marginal spines present

## Cephalothorax

- Areola narrow
- Cervical spine present

## Chelae

- Long, thin chelae
- One row of tubercles on mesial margin of palm (8 -14 tubercles)

## Reproductive organs

- Marbled crayfish are all females
- Annulus ventralis bellshaped



# Marbled crayfish

(*Procambarus virginalis*)

## Color

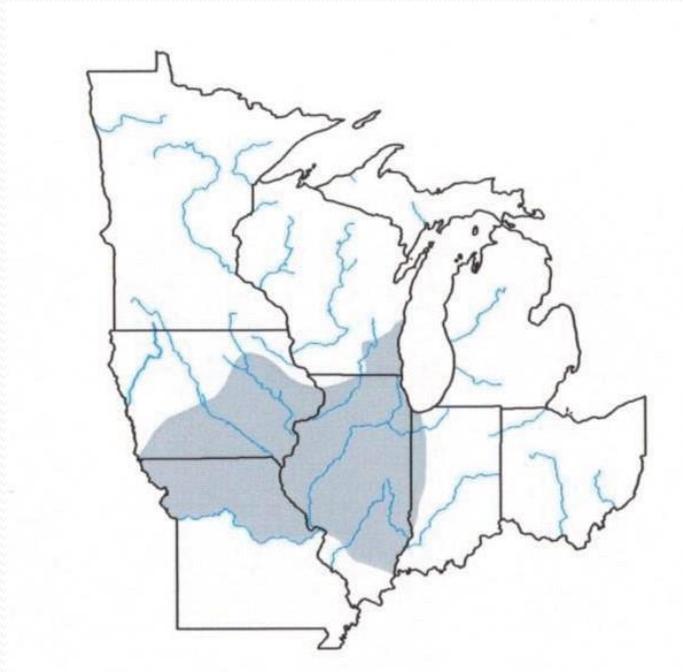
- Typically dark brown, can have light cream and dark brown mottling
- Dark tubercles on chelae
- Light cream median longitudinal stripe on the cephalothorax extending through the center of the areola



# Prairie crayfish

(*Procambarus gracilis*)

- Native in southeastern Wisconsin
- Burrower, often with chimneys
- Constructs deep burrows in prairie regions, sometimes long distances from permanent water
- Can sometimes be found in open water in wetlands or streams



# Prairie crayfish (*Procambarus gracilis*)

## Rostrum

- Rostrum wide
- No marginal spines

## Cephalothorax

- Areola closed or linear at the midpoint
- No cervical spine

## Abdomen

- Abdomen short compared to rest of body

## Chelae

- Chelae wide and triangular in shape
- 6 – 9 large tubercles on mesial margin of palm (typically one row, but occasionally two rows)
- Incision at the base of the moveable finger

## Reproductive organs

- Gonopod ends in four short elements

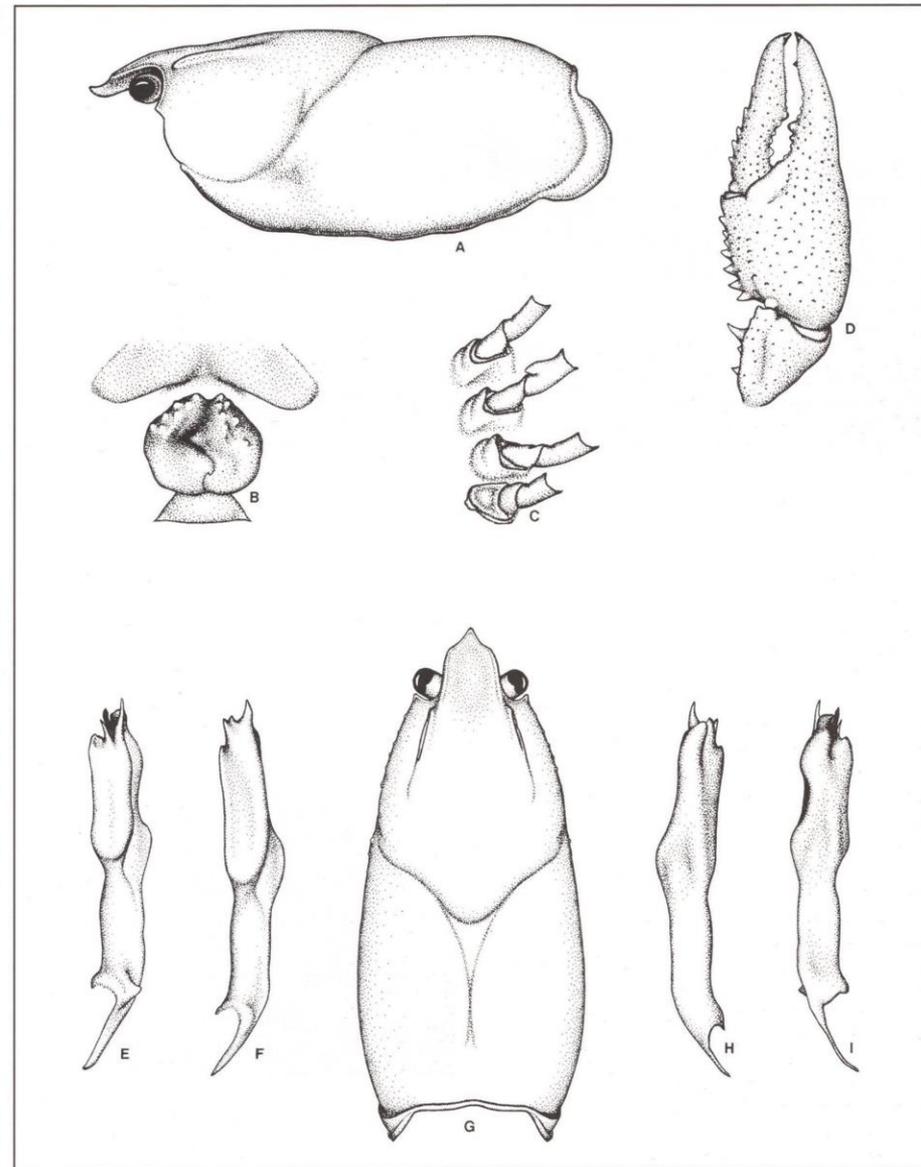


Plate 32. - *Procambarus gracilis*. A, lateral view of carapace; B, female sperm receptacle; C, bases of walking legs of Form I male; D, dorsal view of right pincer; E, mesial view of Form I male gonopod; F, mesial view of Form II male gonopod; G, dorsal view of carapace; H, lateral view of Form II male gonopod; I, lateral view of Form I male gonopod.

# Prairie crayfish

## (*Procambarus gracilis*)

### Rostrum

- Rostrum wide
- No marginal spines

### Cephalothorax

- Areola closed or linear at the midpoint
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### Reproductive organs

- Gonopod ends in four short elements

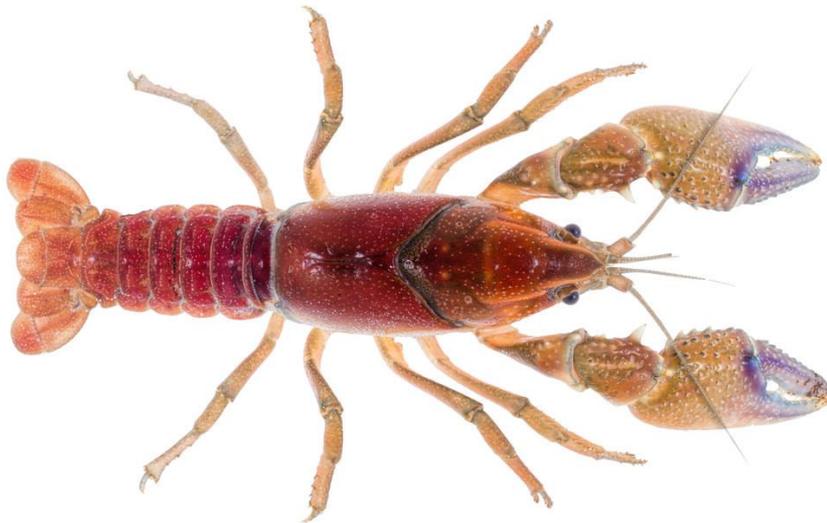


# Prairie crayfish

(*Procambarus gracilis*)

## Color

- Body reddish brown or red without conspicuous spots or blotches
- Rostrum edges light colored
- Arrowhead shape on head



Examples of terminal elements of gonopods of these genera



MI



MII



MI



MII



MI



MII



*Procambarus*



*Cambarus*

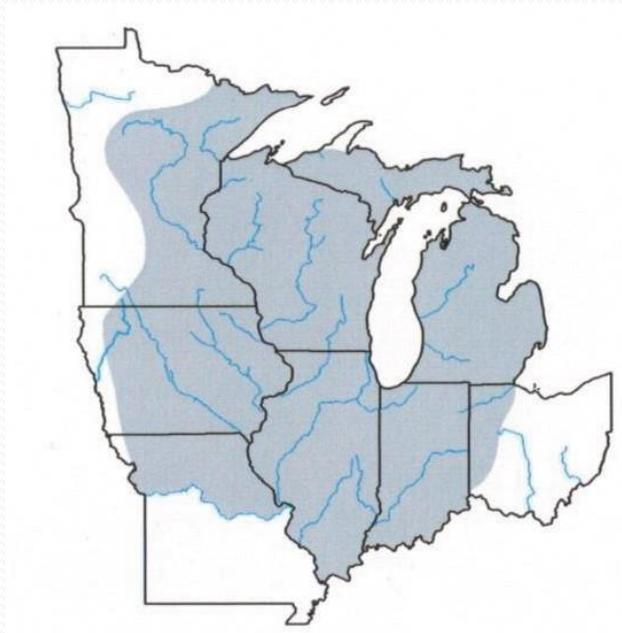


*Faxonius*

MI= Form one male MII= Form two male

# Devil crayfish (*Cambarus diogenes*)

- Native in Wisconsin
- Burrower, often with chimneys
- Burrows common next to streams or in wetlands
- Can be found in open water at some times of the year



# Devil crayfish (*Cambarus diogenes*)

## Rostrum

- Short acumen
- Margins straight
- No marginal spines

## Cephalothorax

- Areola closed and linear
- No cervical spine

## Chelae

- Chelae large and robust
- Two rows of tubercles on mesial margin of palm (4 – 7 tubercles in the row)
- Large gap at base of moveable finger

## Reproductive organs

- Gonopod with two short elements curved 90 degrees (boxing glove)

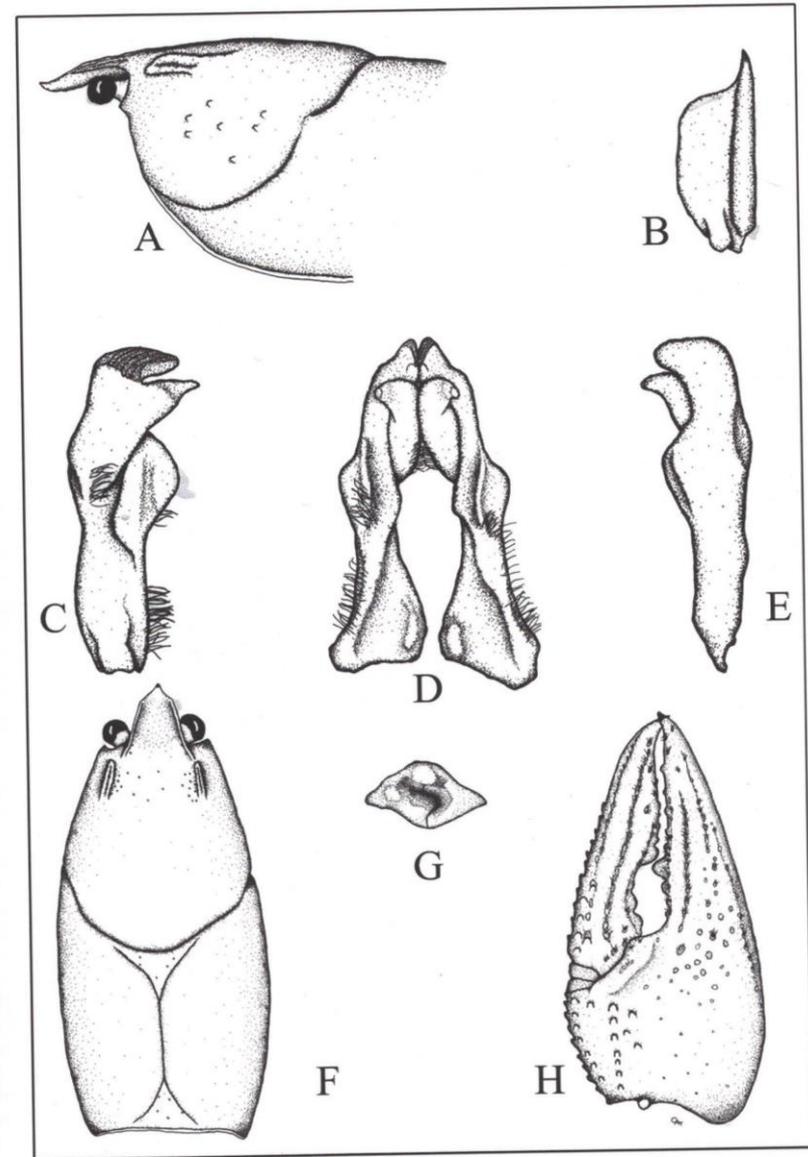


Fig. 51. *Cambarus diogenes*: A, lateral view of carapace; B, dorsal view of right antennal scale; C, mesial view of form I gonopod; D, ventral view of form I gonopods; E, lateral view of form II gonopod; F, dorsal view of carapace; G, lateral view of abdomen with arrow denoting lateral edge of pleuron; H, ventral view of annulus ventralis; I, dorsal view of right chela.

# Devil crayfish

(*Cambarus diogenes*)

## Rostrum

- Short acumen
- Margins straight
- No marginal spines

## Cephalothorax

- Areola closed and linear
- No cervical spine

## Chelae

- Chelae large and robust
- Two rows of tubercles on mesial margin of palm (4 – 7 tubercles in the row)
- Large gap at base of moveable finger

## Reproductive organs

- Gonopod with two short elements curved 90 degrees (boxing glove)



A

B

C

D

# Devil crayfish (*Cambarus diogenes*)

## Color

- Tips of fingers red
- Red markings on margins of rostrum, abdominal segments, and tail fan

## Abdomen

- Flattened



# Species

## Faxonius (previously Orconectes)

- Calico crayfish (*Faxonius immunis*) native
- Virile crayfish (*Faxonius virilis*) native
- Northern clearwater crayfish (*Faxonius propinquus*) native
- Rusty crayfish (*Faxonius rusticus*) **invasive**

## Procambarus

- White river crayfish (*Procambarus acutus*) native
- Red swamp crayfish (*Procambarus clarkii*) **invasive**
- Marbled crayfish (*Procambarus virginalis*) **invasive**
- Prairie crayfish (*Procambarus gracilis*) native

## Cambarus

- Devil crayfish (*Cambarus diogenes*) native

# Overall Distributions

- Calico crayfish fairly rare and hard to find
- Northern Clearwater crayfish not commonly found in southern WI
- Virile, Rusty, and White River crayfish all very common in SE WI
- Prairie crayfish can be found in SE WI
- Virile, Northern Clearwater, and Rusty are common in Northern WI lakes

# Overall habitats

- Calico, virile, northern clearwater, and rusty crayfish: In water either in lakes or streams. Virile crayfish may also be found in stormwater ponds. Rusty crayfish like harder substrates (sand, gravel, rock).
- Devil crayfish: stream side, wetland, burrowers, chimney builders
- White river, red swamp, prairie crayfish: Floodplains, wetlands, stormwater ponds – waterbodies that have a lot of water level fluctuation. All three burrow. Prairie have the most extensive burrows.

# Native WI crayfish species

- The following list includes **Wisconsin native crayfish** which may be possessed, transported, purchased and sold in the state.
- *Cambarus diogenes* - Devil Crayfish
- *Procambarus acutus* - White River Crayfish
- *Procambarus gracilis* - Prairie Crayfish
- *Orconectes propinquus* - Northern Clearwater Crayfish
- *Orconectes virilis* - Virile Crayfish
- *Orconectes immunis* - Calico Crayfish

# Non-Native WI crayfish

- Rusty crayfish (*Faxonius rusticus*)
- Red swamp crayfish (*Procambarus clarkii*)

# Non-Native crayfish not in WI

- Marbled crayfish (*Procambarus virginalis*)

# Features to Focus On (When taking pictures for ID)

- Make sure the photo is in focus.
- Make sure the photo is well lit.
- Include something to illustrate scale of photo.

## Crayfish Identification Characteristics

- Seam in back
- Rostrum
- Claws – notches, tufts, tubercles
- Tail – spots, stripes
- Reproductive organs (underside)
- Overall top view
- Overall side view

