

## THE IMMATURE STAGES OF *GERRIS* (HEMIPTERA) IN BRITISH COLUMBIA

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### ABSTRACT

The immature stages of seven species of *Gerris* that occur in British Columbia are described and keyed.

### INTRODUCTION

Eight species of *Gerris* are recorded from British Columbia and several of these appear to coexist, since they can be captured together at the same place and at the same time (Scudder, 1971). In order to study this apparent coexistence in some detail, it is necessary to be able to identify the species in all of their life stages. While the fifth instar larvae of *G. buenoi* Kirk., *G. comatus* D. & H. and *G. remigis* Say have been described by Sprague (1967), the other larvae that occur in British Columbia are unknown.

This paper describes the five immature instars of seven species of *Gerris* that occur in British Columbia, gives diagnostic keys and some figures. *G. nyctalis* D. & H. was not available for study and so could not be included.

### MATERIAL AND METHODS

Adult *Gerris* were brought into the laboratory in the spring and summer of 1970 and 1971, and cultures of each species were established. Adult *G. buenoi*, *G. incognitus* D. & H., *G. incurvatus* D. & H., *G. notabilis* D. & H. and *G. remigis* were obtained from Marion Lake near Haney in the lower Fraser Valley. *G. pingreensis* D. & H. was collected from a lake on the Batchelor Range north of Kamloops and *G. comatus* from a pond near Westwick Lake in the Cariboo region.

All rearing was done at laboratory temperature (about 22°C) and with natural photoperiod. Food was frozen adult *Drosophila*. Eggs that were obtained from the isolated adults, were kept separate and the emerging larvae were held in small plastic containers. They were fed each day and larvae of each instar as obtained were preserved in 70 per cent alcohol. All measurements were done by use of a graticule eye-piece and are based on five specimens unless otherwise stated. Standard errors have been calculated on the values presented in Table 1 and are available from the authors on request: the Table would

be too large if they were included in this publication.

The keys and values presented in Table 1 have been checked against material that we have collected from the field.

### RESULTS

The diagnostic measurements for the larvae studied are presented in Table 1. The colour patterns are distinctive in most instars and species. The following descriptions record the important features.

#### *G. buenoi*

**FIRST INSTAR** (Fig. 3): head brown-black with pale Y-shaped dorsal ecdysial cleavage line; antennae brown-black with base of first segment pale; rostrum pale with apex black; pronotum with lateral quadrate patches; posterior part of mesonotum + metanotum with a lateral oblong fuscous patch; mid and hind coxal covers brown-black; fore legs brown-black with femora, trochanters and coxae pale; middle and hind legs brown-black with base of trochanters and all of coxae pale; abdominal terga with medio-lateral slender transverse streaks, the anterior ones narrower than the posterior; anal cover fuscous.

**SECOND INSTAR** (Fig. 8): as first instar, but with clypeus and postociput slightly pale; mesonotal patch with centre pale; coxal covers pale; anterior abdominal markings not narrower than posterior.

**THIRD INSTAR** (Fig. 12): as second instar, but with clypeus quite pale; area of postociput adjacent to stem of cleavage line, pale; mesonotum with pale area adjacent to anterior of fuscous patch and this connected to anterior margin of mesonotum by a thin pale line; patch on mesonotum posteriorly pale; abdominal terga with a pale outline to posterior of medio-lateral fuscous spots, and with a series of pale spots also present lateral to the fuscous series.

**FOURTH INSTAR** (Fig. 16): head anteriorly rather pale with fuscous spots at base of the four trichobothria; pronotum with the patch sometimes pale postero-laterally; mesonotum medially brown with a median pale arrow-

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TABLE I. Diagnostic measurements for the larvae of instars of *Gerris* species in British Columbia. Mean values in mm.

Species & instar	Antennal segment				Head width	Middle leg			Hind leg			Sample size
	I	II	III	IV		Femur	Tibia	Tarsus	Femur	Tibia	Tarsus	
<i>buanoi</i>												
First	0.17	0.10	0.13	0.43	0.44	0.65	0.81	0.71	0.61	0.42	0.35	5
Second	0.29	0.17	0.20	0.56	0.60	1.00	1.17	0.91	0.98	0.56	0.44	5
Third	0.40	0.26	0.30	0.70	0.83	1.49	1.68	1.24	1.59	0.85	0.58	5
Fourth	0.60	0.40	0.40	0.77	1.00	2.61	2.36	1.87	2.44	1.24	0.74	5
Fifth	0.76	0.49	0.52	0.97	1.18	3.69	3.15	2.57	3.48	1.80	1.01	5
<i>comatus</i>												
First	0.15	0.12	0.12	0.42	0.45	0.75	0.86	0.69	0.63	0.46	0.43	3
Second	0.25	0.13	0.20	0.53	0.61	1.24	1.34	1.09	1.12	0.71	0.58	2
Third	0.43	0.27	0.30	0.63	0.87	2.00	1.97	1.57	2.00	1.10	0.73	1
Fourth	0.66	0.40	0.40	0.74	1.02	3.18	2.74	1.85	2.95	1.62	0.96	2
Fifth	1.02	0.56	0.55	0.87	1.34	4.95	3.82	2.98	4.62	2.52	1.55	3
<i>incognitus</i>												
First	0.20	0.13	0.17	0.43	0.48	0.69	0.83	0.71	0.61	0.48	0.40	5
Second	0.27	0.17	0.20	0.53	0.63	1.16	1.22	0.94	1.03	0.70	0.50	5
Third	0.34	0.20	0.28	0.65	0.83	1.79	1.60	1.27	1.57	0.96	0.68	5
Fourth	0.60	0.33	0.40	0.80	1.01	2.70	2.25	1.62	2.52	1.43	0.83	5
Fifth	0.83	0.50	0.53	0.92	1.25	3.73	3.00	2.09	3.55	2.00	1.08	5
<i>incurvatus</i>												
First	0.20	0.13	0.17	0.42	0.49	0.76	0.96	0.81	0.67	0.52	0.42	5
Second	0.26	0.17	0.20	0.53	0.59	1.25	1.33	1.09	1.13	0.71	0.56	5
Third	0.42	0.26	0.30	0.63	0.83	2.10	2.00	1.50	1.90	1.06	0.69	5
Fourth	0.65	0.40	0.45	0.76	1.01	3.17	2.73	2.07	2.92	1.57	0.94	5
Fifth	0.97	0.60	0.62	0.87	1.27	4.64	3.81	2.83	4.31	2.64	1.37	5
<i>notabilis</i>												
First	0.23	0.17	0.20	0.59	0.52	1.06	1.29	1.04	0.96	0.59	0.51	5
Second	0.39	0.30	0.33	0.82	0.79	1.78	1.78	1.49	1.68	0.94	0.65	5
Third	0.68	0.54	0.54	1.11	1.08	3.16	2.85	2.24	2.96	1.63	0.90	5
Fourth	1.07	0.82	0.79	1.32	1.37	4.84	4.20	3.16	4.84	2.84	1.42	5
Fifth	1.88	1.43	1.16	1.58	1.81	7.88	6.18	4.56	8.14	5.10	2.06	5
<i>pingreensis</i>												
First	0.20	0.17	0.13	0.40	0.47	0.67	0.77	0.67	0.60	0.47	0.40	1
Second	0.26	0.17	0.20	0.46	0.63	1.09	1.07	0.92	0.94	0.64	0.54	2
Third	0.43	0.23	0.27	0.60	0.83	1.67	1.57	1.13	1.53	0.97	0.77	1
Fourth	0.54	0.36	0.40	0.78	1.04	2.61	2.31	1.78	2.51	1.47	0.96	2
Fifth	0.86	0.46	0.50	0.86	1.24	3.75	3.30	2.53	3.75	2.15	1.33	4
<i>remigis</i>												
First	0.23	0.13	0.21	0.45	0.58	1.14	1.35	1.08	1.07	0.72	0.54	5
Second	0.38	0.20	0.32	0.58	0.82	1.97	2.04	1.41	1.81	1.09	0.66	5
Third	0.56	0.34	0.46	0.72	1.12	3.29	3.14	1.98	2.87	1.67	0.93	5
Fourth	0.92	0.49	0.65	0.88	1.44	5.02	4.68	2.64	4.66	3.66	1.32	5
Fifth	1.50	0.76	0.89	1.13	1.77	7.48	6.62	3.34	6.66	5.10	1.82	5

shaped mark; pale area to base of wing buds forming a W-shaped mark or at least with a pair of slender pale lines connecting to anterior margin of mesonotum; stem of arrow on mesonotum brown, the head fulvous; centre of anterior abdominal terga with a median brown line; pale and fuscous spots as in third instar; fore tarsi quite black.

FIFTH INSTAR (Fig. 21): head brown black with clypeus black, paraclypeal lobes pale; frons with centre pale, and with four fuscous spots, two on each side; vertex with Y-shaped pale line; pronotum black with central longitudinal pale line; mesonotum with a central, posteriorly pointing arrow, the head fulvous and shaped as in Fig. 26, the stem brown margined with white; mesonotum

antero-laterally with posteriorly pointing small arrow-shaped white mark; abdominal dorsum fuscous with markings as in previous two instars; legs and antennae coloured as in adult.

*G. comatus*

FIRST INSTAR: coloration as in first instar of *G. buanoi*, with markings on anterior abdominal terga narrower than those on posterior terga; markings on posterior terga slightly quadrate.

SECOND INSTAR: as in first instar; head with frons and vertex medially and laterally rather pale; centre of pronotal patches sometimes pale; mesonotal patches fuscous only in centre; mesonotal patches surrounded by pale lines and each connected to anterior margin of mesonotum by a thin white line;

abdominal fuscous spots about same size on all terga, surrounded by white outline posteriorly; with vague series of pale spots laterally to fuscous series.

**THIRD INSTAR:** Markings as in second instar with the pale outline to mesonotal patches broader; mesonotum without an obvious arrow-shaped mark; abdominal terga with lateral pale spots distinct.

**FOURTH INSTAR (Fig. 18):** head fuscous with a central pale streak to frons that extends to clypeus, and vertex with lateral pale longitudinal streaks that extend forwards; pronotum with a central longitudinal brown line outlined with white; mesonotum with a central arrow-shaped mark, the stem brown margined with white, the head with narrow arms; fuscous areas on mesonotum with pale region adjacent anteriorly and this connected to anterior margin of mesonotum by a pale line; abdominal fuscous spots rather large and about same size, margined with white and with a series of pale spots laterally.

**FIFTH INSTAR (Fig. 22):** head marked much as in fourth instar; mesonotum with a medium arrow-shaped mark, the stem with a brown centre basally, the head with shape as in Fig. 24; abdominal markings similar to fourth instar.

#### *G. incognitus*

**FIRST INSTAR (Fig. 1):** coloration as in first instar of *G. buenoi*, but with markings on abdominal terga about same size on all segments and rather quadrate.

**SECOND INSTAR (Fig. 6):** as first instar, but vertex slightly pale; mesonotal patch somewhat pale postero-laterally.

**THIRD INSTAR (Fig. 10):** basal three antennal segments pale basally; centre of frons with two longitudinal pale streaks; clypeus pale; mesonotal patches with C-shaped pale mark dividing fuscous area into two; fuscous spots on abdominal terga with pale outline posteriorly.

**FOURTH INSTAR (Fig. 14):** similar to third instar, but with pale lines on frons continuous on vertex; mesonotum with a median longitudinal brown streak outlined with white; mesonotum with an oblique pale streak through middle of fuscous patches, these oblique streaks connected to anterior margin of mesonotum by a thin pale line; centre of mesonotum with an arrow-shaped mark, the head shape similar to Fig. 27; anterior abdominal terga with small fuscous spot to outside of medio-lateral markings.

**FIFTH INSTAR (Fig. 19):** head with markings as in fourth instar; frons with additional fuscous spots laterally; pronotum black with a median longitudinal pale streak; mesonotum black with a median arrow-shaped mark, the stem brown margined with white, the head shaped as in Fig. 27; mesonotum antero-laterally with pale C-shaped markings; abdominal terga with markings similar to fourth instar; legs and antennae coloured as in adult.

#### *G. incurvatus*

**FIRST INSTAR (Fig. 2):** coloration as in first instar of *G. buenoi*, the anterior abdominal terga with markings narrower than on posterior terga; markings on posterior terga somewhat irregularly quadrate.

**SECOND INSTAR (Fig. 7):** as first instar, but with clypeus and centre of frons pale; mesonotal patches with only centre fuscous; metanotal and abdominal fuscous markings margined with white posteriorly.

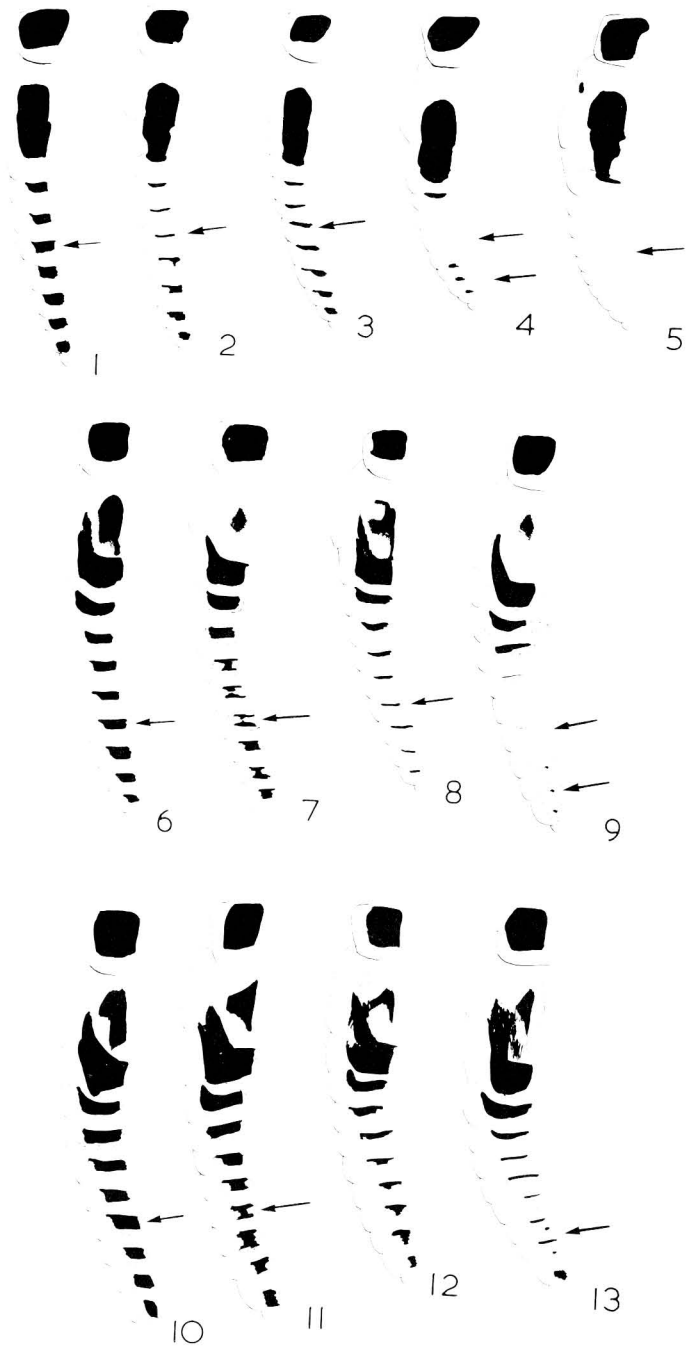
**THIRD INSTAR (Fig. 11):** as second instar, but head fuscous only behind eyes, at base of trichobothria and as two longitudinal streaks on vertex; pronotal patches sometimes slightly pale laterally; mesonotal patches fuscous only in centre, and mesonotum with apex of wing buds fuscous or with an oval fuscous mark; abdominal terga with a series of pale spots lateral to the medio-lateral fuscous series.

**FOUR INSTAR (Fig. 15):** as third instar; pronotum brown with the fuscous patches outlined postero-medially with white; mesonotum with a median arrow-shaped mark, the stem brown margined with white, the head fulvous with shape similar to Fig. 25; mesonotal patches antero-laterally pale with a white line extending to anterior margin of mesonotum; wing buds black; abdominal markings as in third instar.

**FIFTH INSTAR (Fig. 20):** head pale with centre of frons and vertex black, except for a median longitudinal pale streak and four pale spots, two on each side of the pale streak; pronotum black with a median longitudinal pale line; mesonotum black with a median arrow-shaped mark, the head shaped as in Fig. 25, the stem brown margined with fulvous; mesonotum often with small antero-lateral pale spot; abdominal dorsum coloured as in fourth instar; legs and antennae coloured as in adult.

#### *G. notabilis*

**FIRST INSTAR (Fig. 5):** coloration as in first instar of *G. buenoi*, but with metacoxal covers only slightly fuscous, and abdominal



Figs. 1-13. Left side of thoracic and abdominal dorsum of *Gerris* larvae showing colour pattern: 1, *G. incognitus*, first instar; 2, *G. incurvatus*, first instar; 3, *G. buenoi*, first instar; 4, *G. remigis*, first instar; 5, *G. notabilis*, first instar; 6, *G. incognitus*, second instar; 7, *G. incurvatus*, second instar; 8, *G. buenoi*, second instar; 9, *G. remigis*, second instar; 10, *G. incognitus*, third instar; 11, *G. incurvatus*, third instar; 12, *G. buenoi*, third instar; 13, *G. remigis*, third instar. Not to same scale.

terga without fuscous markings.

**SECOND INSTAR:** Head brown-black with Y-shaped dorsal ecdysial cleavage line quite pale, and lateral areas of vertex pale and centre with a pale stripe, this central pale stripe continued all down body; pronotum with lateral areas only margined with fuscous; mesonotum with vague lateral longitudinal pale and fuscous streaks close together; abdominal terga without distinct markings other than the central pale stripe.

**THIRD INSTAR:** Instar longitudinally striped and similar to second instar; first and second antennal segments basally pale; body dorsally with central pale longitudinal stripe margined with brown; pronotum margined with brown; mesonotum anteriorly with on each side, two lateral pale stripes separated by a brown streak; abdominal dorsum with vague medio-lateral longitudinal brown streaks; femora pale with dorsal fuscous streak.

**FOUR INSTAR:** coloration as in third instar, but with third antennal segment also medially pale; body with dorsal longitudinal streaks more distinct, with an additional pale streak laterally on pronotum and mesonotum.

**FIFTH INSTAR:** head brown-black with pale Y-shaped ecdysial line, lateral pale streak before eyes and a median pale longitudinal line, the latter continued down centre of thorax and as a vague broken line down centre of abdominal dorsum; wing buds black; mesonotum with medio-lateral brown stripe; abdominal terga anteriorly with pale medio-lateral spots.

#### *G. pingreensis*

**FIRST INSTAR:** coloration as in first instar of *G. buenoi*, but with fuscous patches on abdominal terga large and rather like those of *G. incognitus*.

**SECOND INSTAR:** as first instar, but with lateral areas of vertex pale; frons with medio-lateral pale stripes; mesonotal patches fuscous in centre, surrounded by pale line and then connected to anterior margin of mesonotum by a thin pale line; markings on abdominal dorsum circled with white.

**THIRD INSTAR:** markings as in second instar, and with small black spot on anterior terga lateral to the larger fuscous markings.

**FOURTH INSTAR:** similar to third instar; head brown with pale Y-shaped ecdysial cleavage line and four pale spots on frons; pronotum brown with the fuscous patches narrowly margined with white postero-medially; mesonotum with the fuscous patches

narrowly margined with white, the centre of the mesonotum appearing as a brown line margined with white; mesonotum without an obvious arrow-shaped mark; abdominal dorsum brown, the fuscous patches large, narrowly margined with white and very distinct.

**FIFTH INSTAR (Fig. 23):** similar to fourth instar; mesonotum with central brown line narrowly margined with white; mesonotum laterally with a small pale anterior dash; medio-laterally mesonotum quite black, without a distinct arrow-shaped mark; abdominal markings distinct.

#### *G. remigis*

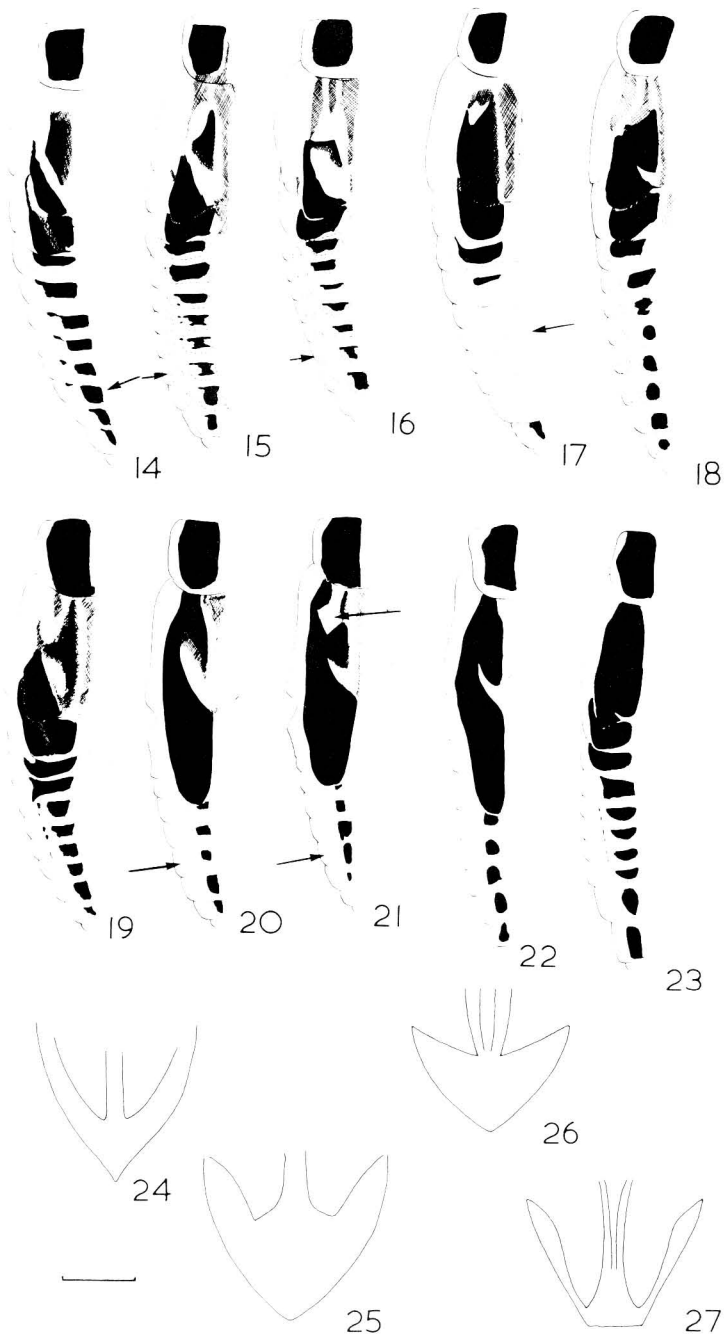
**FIRST INSTAR (Fig. 4):** coloration as in first instar of *G. buenoi*, but dorsum generally more brownish; anterior abdominal terga without fuscous markings, four of the posterior terga only with small medio-lateral black spots.

**SECOND INSTAR (Fig. 9):** as first instar, but with clypeus pale and with lateral parts of frons and vertex somewhat pale; mesonotum with a small oval fuscous spot on each side; metanotum and first visible abdominal tergum with the fuscous markings margined with white; anterior abdominal terga in general with very narrow fuscous streaks at junction of terga, and at most with only a vague pale area surrounding these marks; three of posterior terga only with distinct oval pale patches, these usually with a very small central black point.

**THIRD INSTAR (Fig. 13):** coloration as in second instar, but with mesonotal patches larger and more or less triangular, and with pale more or less whitish streaks along the anterior and median sides of the triangle; lateral margins of mesonotal wing buds narrowly fuscous with ferruginous area between this and the triangular spot; abdominal tergum before anal tube with a pair of fuscous patches; other abdominal terga marked as in second instar, but markings more distinct.

**FOUR INSTAR (Fig. 17):** coloration as in third instar, centre of mesonotum with a central longitudinal olive coloured stripe margined with dark brown; pale markings on median abdominal terga not always clearly evident.

**FIFTH INSTAR:** coloration much the same as fourth instar, but head with base of paraclypeal lobes slightly pale, and with a distinct pale spot before each eye; mesonotum black with a more or less distinct central arrow-shaped mark, the stem brown margined with white, the head vague and brown; mesonotum



Figs. 14-23. Left side of thoracic and abdominal dorsum of *Gerris* larvae showing colour pattern: 14, *G. incognitus*, fourth instar; 15, *G. incurvatus*, fourth instar; 16, *G. buenoi*, fourth instar; 17, *G. remigis*, fourth instar; 18, *G. comatus*, fourth instar; 19, *G. incognitus*, fifth instar; 20, *G. incurvatus*, fifth instar; 21, *G. buenoi*, fifth instar; 22, *G. comatus*, fifth instar; 23, *G. pingreensis*, fifth instar. Figs. 24-27. Outline of arrow head-shaped mark on mesonotum of fifth instar larvae of *Gerris*: 24, *G. comatus*; 25, *G. incurvatus*; 26, *G. buenoi*; 27, *G. incognitus*. Figs. 14-23 not to same scale. Scale line for Figs. 24-27 = 0.3 mm.

antero-laterally with pale dashes; legs and antennae coloured as in adult.

### KEY TO LARVAL INSTARS OF *GERRIS* SPECIES IN BRITISH COLUMBIA

#### Key to instars

1. —Wing buds long and fore wing buds completely overlapping hind wing buds; if wing buds not completely overlapping head width 1.15 mm. or more<sup>2</sup> . . . . . Fifth instar
- Wing buds absent, or if present, then not overlapping . . . . . 2
2. Wing buds distinct, the postero-lateral corners of mesonotum somewhat produced caudad . . . . . 3
- Wing buds not present, the postero-lateral corners of mesonotum not produced caudad . . . . . 4
3. Wing buds visible, but not greatly extended caudad . . . . . Third instar
- Wing buds clearly evident and obviously extended caudad . . . . . Fourth instar
4. Mesonotum + metanotum laterally with a single oblong-oval fuscous mark on each side; head width usually 0.58 mm. or less . . . . . First instar
- Mesonotum + metanotum laterally with disjunct fuscous markings; head width usually over 0.59 mm . . . . . Second instar

To date we have not been able to separate the early instars of *G. comatus* from those of *G. incurvatus*, and *G. incognitus* from *G. pingreensis*. However, in British Columbia they may be separated on geography. It seems that the members of these two pairs of species replace each other geographically. Thus *G. comatus* and *G. pingreensis* occur in the Cariboo area and to the north, while *G. incognitus* and *G. incurvatus* are found to the south (Scudder, 1971).

#### Key to first instar larvae

1. Middle tibiae over 1.0 mm. in length . . . . . 2
- Middle tibiae less than 1.0 mm. in length . . . . . 3
2. Abdominal dorsum without fuscous markings; length of fourth antennal segment greater than width of head . . . . . *notabilis*
- Posterior abdominal terga with medio-

lateral fuscous markings; length of fourth antennal segment less than width of head . . . . . *remigis*

3. Medio-lateral black markings on abdominal terga quadrate and all about same size . . . . . *incognitus* + *pingreensis*
- Medio-lateral black markings on abdominal terga not all quadrate and all about same size, anterior narrower than posterior . . . . . 4
4. Posterior markings somewhat quadrate, but irregular . . . . . *comatus* + *incurvatus*
- Posterior markings less quadrate, but regular . . . . . *buenoii*

#### Key to second instar larvae

1. Head width over 0.75 mm.; middle femur over 1.75 mm . . . . . 2
- Head width less than 0.70 mm.; middle femur less than 1.50 mm. . . . . 3
2. Dorsum of insect with median pale and other longitudinal stripes . . . . . *notabilis*
- Dorsum of insect without longitudinal stripes . . . . . *remigis*
3. Medio-lateral markings on abdominal terga all slender and getting gradually smaller from anterior to posterior . . . . . *buenoii*
- Medio-lateral markings on abdominal terga not slender and getting gradually smaller from anterior to posterior . . . . . 4
4. Medio-lateral black markings on abdominal terga all regularly quadrate and very distinct, not in obvious pale spots . . . . . *incognitus* + *pingreensis*
- Medio-lateral black markings on abdominal terga irregular in outline and usually in rather distinct pale spots . . . . . *comatus* + *incurvatus*

#### Key to third instar larvae

1. Head with 1.0 mm. or more; middle femur 2.75 mm. or more . . . . . 2
- Head width less than 0.9 mm.; middle femur less than 2.5 mm. . . . . 3
2. Dorsum with longitudinal stripes . . . . . *notabilis*
- Dorsum not longitudinally striped . . . . . *remigis*
3. Abdominal dorsum with a lateral series of pale spots to outside of medio-lateral fuscous series . . . . . 4
- Abdominal dorsum without a lateral series of pale spots to outside of the medio-lateral fuscous series . . . . . *incognitus* + *pingreensis*
4. Anterior medio-lateral fuscous markings on

<sup>2</sup>Fourth instar *G. notabilis* and *G. remigis* will key out at this point, but are readily recognized on size and colour pattern.

abdominal dorsum narrow and not quadrate; ..... **buenoi**

— Anterior medio-lateral fuscous markings on abdominal dorsum rather quadrate and not slender .....

..... **comatus + incurvatus**

**Key to fourth instar larvae**

1. Head width 1.30 mm. or more; middle femur 4.5 mm. or more ..... 2

— Head width less than 1.20 mm.; middle femur 3.5 mm. or less ..... 3

2. Dorsum longitudinally striped .. **notabilis**

— Dorsum not longitudinally striped .....

..... **remigis**

3. Abdominal dorsum with a lateral series of pale spots to outside of medio-lateral series of fuscous markings ..... 4

— Abdominal dorsum without a lateral series of pale spots to outside of medio-lateral series of fuscous markings ..... 6

4. Anterior medio-lateral fuscous markings on abdominal dorsum narrow and not quadrate; mesonotum with double pale lines connecting pale area round mesonotal patch with anterior margin of notum .....

..... **buenoi**

— Anterior medio-lateral fuscous markings on abdominal dorsum rather quadrate, and not narrow .....

..... 5

5. Arrow-shaped mark on mesonotum with head shaped similar to Fig. 24 ... **comatus**

— Arrow-shaped mark on mesonotum with head shaped similar to Fig. 25 ..

..... **incurvatus**

6. Mesonotum with an arrow-shaped mark with head shaped similar to Fig. 27 .....

..... **incognitus**

— Mesonotum without a distinct median arrow-shaped mark .....

..... **pingreensis**

**Key to fifth instar larvae**

1. Head width 1.75 mm. or more; middle femur 7.0 mm. or more ..... 2

— Head width 1.45 mm. or less; middle femur 5.5 mm. or less ..... 3

2. Dorsum longitudinally striped .. **notabilis**

— Dorsum not longitudinally striped .....

..... **remigis**

3. Abdominal dorsum with a lateral series of pale spots to outside of medio-lateral series of fuscous markings ..... 4

— Abdominal dorsum without a lateral series of pale spots to outside of medio-lateral series of fuscous markings ..... 6

4. Mesonotum antero-laterally with pale posterior pointing arrow-shaped marks; mesonotum with a median arrow-shaped mark, the head shaped as in Fig. 26 .....

..... **buenoi**

— Mesonotum antero-laterally without pale arrow-shaped marks .....

..... 5

5. Arrow-shaped mark in middle of mesonotum with head shaped as in Fig. 24 .....

..... **comatus**

— Arrow-shaped mark in middle of mesonotum with head shaped as in Fig. 25 .....

..... **incurvatus**

6. Mesonotum with arrow-shaped mark in centre, and head with shape as in Fig. 27 ..

..... **incognitus**

— Mesonotum without a distinct arrow-shaped mark in centre .....

..... **pingreensis**

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**References**

Scudder, G. G. E., 1971. The Gerridae (Hemiptera) of British Columbia. J.ent. Soc. Brit. Columbia **68**:3-10.  
 Sprague, I. B., 1967. Nymphs of the genus **Gerris** (Heteroptera:Gerridae) in New England. Ann. ent. Soc. Amer. **60**:1038-1044.