

How to estimate instar, revisited

I'm the founder and co-administrator of the [Odonate Larvae and Exuviae](#) Facebook group. Friday, 12 November 2021 was the two-year anniversary of the group. As of this writing there are approximately 1,700 members in the group, including people from around the world.

For example, Abiodun Matthew Adedapo from Nigeria. Abiodun began [posting to the group](#) relatively recently, sharing information and photos related to his research. Sincere thanks to Abiodun for permission to repurpose two of his photos for another mini-lesson on [how to estimate instar](#).

What is the instar? Not F-o.

The equation for instar equivalent is as follows.

$$\text{Instar equivalent} = \text{HwL} / \text{HW}$$

Where **HwL** is **H**ind **w**ing **L**ength and **HW** is **H**ead **W**idth.



Photo used with written permission from Abiodun Matthew Adedapo.

I used the Adobe Photoshop “Ruler Tool” to measure the number of pixels along the two double-tipped white arrows shown in the preceding [annotated image](#) of a preserved specimen collected and photographed by Abiodun.

HwL is ~132.6 pixels. HW is ~195.12 pixels.

Instar equivalent = 132.6 pixels / 195.12 pixels

The units cancel, so the answer is ~0.68 — close to Ken Tennessen’s average value for F-1 (final instar minus one).

Abiodun reported the instar as F-2, based upon in situ observations of a cohort of larvae (nymphs) from Family Gomphidae (Clubtails).

For my purpose, it doesn’t matter whether the actual instar is either F-1 or F-2 — the important take-away is we know the instar *is not* F-0, the final instar. This provides an opportunity to mention a simpler way to estimate final instar.

Larvae in the final stage can be recognized by the length of the wing buds which cover the fourth abdominal segment. Source Credit: [Field Guide to the larvae and exuviae of British Dragonflies](#), by Steve Cham, p. 30.

Look closely at the [first annotated image](#). Notice the length of the wing buds/pads doesn’t reach the fourth [abdominal segment](#) (S4) of the specimen therefore this larva *is not in its final instar*.

Thanks to Freda van den Broek for sharing this method with me!

F-0 (final instar)

The last annotated image shows part of a different larva also collected and photographed by Abiodun. Notice the length of the wing buds/pads *does reach* S4, therefore this larva *is in its final instar*.



Photo used with written permission from Abiodun Matthew Adedapo.

Related Resources

[How to estimate instar](#), a blog post by Walter Sanford.

[How to estimate instar using Photopea](#)

Copyright © 2021 [Walter Sanford](#). All rights reserved.

Tags: [Family Gomphidae \(Clubtails\)](#), [instar equivalent](#), [larva](#), [larvae](#), [nymph](#), [nymphs](#)

This entry was posted on November 16, 2021 at 4:00 am and is filed under [digital photography](#), [dragonflies](#), [education](#), [How To](#), [macro photography](#), [natural science](#), [Photoshop](#), [wildlife photography](#). You can follow any responses to this entry through the [RSS 2.0](#) feed. You can leave a response, or [trackback](#) from your own site.