

**NOTES ON THE EFFECT OF TEMPERATURE ON EGG  
DEVELOPMENT OF *LEUCORRHINIA GLACIALIS* HAGEN  
(ANISOPTERA: LIBELLULIDAE)**

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Under laboratory conditions, no hatching took place at temperatures below 17.5° C. The duration of embryonic development, at different experimental temperatures, varied from 36.48 to 7.20 days. Egg mortality was lowest between 22.5 and 27.5° C, and increased rapidly at temperatures above 30° C. These observations are compared with the evidence on *L. rubicunda* and *L. intacta*.

**INTRODUCTION**

In Quebec, *Leucorrhinia glacialis* Hagen is among the first dragonflies to emerge in early June (PILON et al., 1986) and adults are present in the field until early September (HUTCHINSON & LAROCHELLE, 1977). It occurs in the subarctic boreal and cold temperate zone of the province (HUTCHINSON & LAROCHELLE, 1977; PILON et al., 1978). In the Laurentides, it is the most abundant representative of the genus (ROBERT, 1963).

Studies on the bioclimatic requirements of *Leucorrhinia* are few in the odonatological literature. DEACON (1975) studied the seasonal regulation of *L. intacta* Hagen in Ontario while SOEFFING (1986) reported on the European *L. rubicunda* (L.). Finally, PRITCHARD & LEGGOTT (1987), in their discussion on the origin of dragonflies, referred to their unpublished data on *L. borealis* Hagen and *L. proxima* Calvert.

As mentioned by PRITCHARD & LEGGOTT (1987), very little evidence is available on the relationship between the rate of egg development and temperature. This paper records the results of a preliminary experiment on the influence

of temperature on the embryonic development of *L. glacialis* adding to the hitherto available data for Quebec.

#### MATERIAL AND METHODS

This preliminary study was undertaken at the Station de Biologie de l'Université de Montréal (46°N; 74°W) at Saint-Hippolyte, Québec. Eggs were obtained from adults captured in the field and incubated according to the method described by DESFORGES & PILON (1986).

#### RESULTS

In Table I are shown the results obtained at experimental temperatures ranging from 12.5 to 32.5° C. No hatching was observed at temperatures below 17.5° C, indicating that the hatching threshold for this species is situated between 15 and 17.5° C. SOEFFING (1986) found that no hatching took place below 6° C in the case of *L. rubicundâ*. The embryonic development at the different experimental temperatures was varying from 36.48 to 7.20 days. The lowest rate of egg mortality was observed between 22.5 and 27.5° C. At temperatures of 30° C and higher mortality was observed to increase.

Table I  
Mean duration of the embryonic development of eggs of *Leucorrhinia glacialis* at constant temperatures and mortality rate at these temperatures.

Temp (° C)	Number of eggs	Mortality (%)	Mean embryonic development (days)	Standard deviation $\delta x$
12.5	46	100.	—	—
15.0	64	100.	—	—
17.5	49	50.9	36.48	1.36
20.0	55	21.8	24.56	0.87
22.5	66	0.0	21.75	0.41
25.0	41	0.0	13.23	0.70
27.5	73	0.0	9.56	0.47
30.0	59	1.7	8.63	0.57
32.5	52	18.7	7.20	0.33

In Figure 1 is illustrated the developmental index based on the duration of the embryonic development as proposed by DAVIDSON (1944). The developmental index curve for this species was calculated to be  $y = 19.87/1 + e^{4.9413 - 1.685x}$ . The lowest threshold of development was calculated according to

TROTTIER's method (1971) and was found to be 14.15° C. In Canada, DEACON (1975) reported that eggs of *L. intacta* died when incubated at temperatures below 13° C.

Successful development was observed to take place at temperatures between 22.5 and 27.5° C in our experiments. OLIVIER (1980) found that in the Lower Laurentides, from June to August, surface water temperature was oscillating between 17.5 and 27.0° C. As far as egg development is concerned it seems that there are favourable conditions in the field for successful embryonic development.

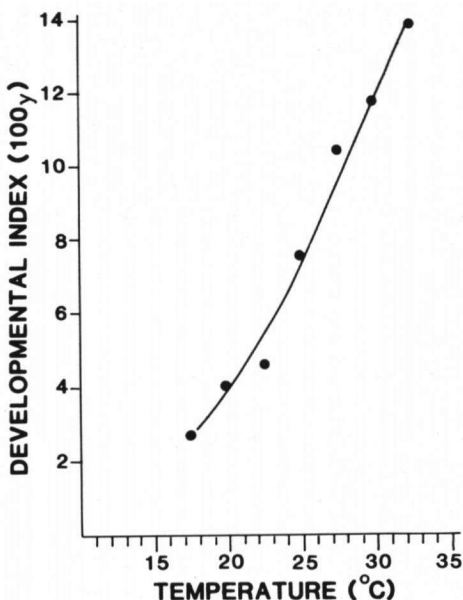


Fig. 1. Effect of temperature on the embryonic development of *Leucorrhinia glacialis*.

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