

Short Communication

CATACLYSTA LEMNATA L. (LEPIDOPTERA, PYRALIDAE) CAN SURVIVE FOR SEVERAL YEARS CONSUMING MACROPHYTES OTHER THAN LEMNACEAE

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ABSTRACT

Van der Velde, G., 1988. *Cataclysta lemnata* L. (Lepidoptera, Pyralidae) can survive for several years consuming macrophytes other than Lemnaceae. *Aquat. Bot.*, 31: 183–189.

Caterpillars of *Cataclysta lemnata* L. are able to consume parts of a number of macrophyte species other than Lemnaceae. The species can survive without Lemnaceae for several years and can thus not be regarded as a real stenophagous species as is often recorded in the literature. Damage patterns are described and illustrated.

Some pyralid Lepidoptera have aquatic larvae. Most of these semi-aquatic species are described as more or less polyphagous, because their caterpillars can consume more than one, or even a whole series of macrophyte species (Gaevs kaya, 1969). Of the European species only one, *Cataclysta lemnata* L., has traditionally been considered to be stenophagous, as it seemed to be restricted to Lemnaceae (e.g. Dethier and Haenni, 1986). Recently, however, observations were made in aquarium tests and in artificial and natural ponds, which indicate that the caterpillars of this species can also consume macrophytes other than Lemnaceae (see Table 1).

Caterpillars of *C. lemnata* have four instars, the first two hydrophilous, the last two hydrophobous. Caterpillars in the hydrophobous stage float near the water surface in their cases made out of macrophyte material from various origins. In the hydrophobous stage their larval skin is covered with a dense layer of characteristic hairs (Fig. 1), which maintain a sheath of air (plastron) around the body, so that the larvae can respire under water (see also Müller, 1892). The last larval stages are the most voracious and cause most damage to the macrophytes by consumption and case-building activities.

Gaevs kaya (1969) mentioned *Elodea* as a food plant of *C. lemnata*; Lekic and Mihajlovic (1971) recorded the occurrence of *C. lemnata* larvae on *Hydro-*

TABLE 1

List of food plants of *Cataglyphis lemnae* L.

Taxa	Conditions	Source ^a
<i>Lemna</i> sp.	Field	1, 2
<i>Lemna minor</i> L.	Field	1
<i>Spirodela polyrhiza</i> (L.) Schl.	Field	1
<i>Elodea canadensis</i> Michx.	Field	1
<i>Myriophyllum spicatum</i> L.	Field	2
<i>Hydrocharis morsus-ranae</i> L.	Field, garden pond	2, 5
<i>Nymphoides peltata</i> (Gmel.) O. Kuntze	Outdoor tank	3
<i>Nymphaea</i> sp.	Outdoor water lily culture	4
<i>Nymphaea alba</i> L.	Outdoor tank, garden pond	5
<i>Nymphaea candida</i> Presl	Outdoor tank, garden pond	5
<i>Stratiotes aloides</i> L.	Garden pond	5
<i>Potamogeton lucens</i> L.	Garden pond, aquarium	5, 1
<i>Typha latifolia</i> L. ^b	Aquarium	1
<i>Glyceria maxima</i> (Hartm.) Holmb. ^b	Aquarium	3
<i>Glyceria fluitans</i> (L.) Br. ^b	Aquarium	3

^a1 = Gaevskaya, 1969; 2 = Lekic and Mihajlovic, 1971; 3 = van der Velde, 1979; 4 = Ulenberg et al., 1983; 5 = this paper.

^bDecaying leaves only.

charis and *Myriophyllum* species. After it had been observed, that *C. lemnae* can consume leaf-blade material of *Nymphoides peltata* (Gmel.) O. Kuntze in the absence of *Lemna* (van der Velde, 1979; van der Velde et al., 1982), more of such observations have been made. In outdoor concrete tanks in the grounds of the University of Nijmegen (The Netherlands), floating leaves of *Nymphaea alba* L. and *Nymphaea candida* Presl were also found to be damaged by caterpillars of this species. Pupation took place in pupal cases, which were attached to the lower surfaces of the floating leaves. Ulenberg et al. (1983) recorded that water lilies (*Nymphaea* sp.) were damaged by caterpillars of *Paraponyx stratiotata* L., *Nymphula nymphaeata* L. and *C. lemnae*. The last mentioned species caused serious problems in a commercial water-lily culture. In the garden pond of the author at Nijmegen, *C. lemnae* was observed each year. During the last 5 years Lemnaceae have no longer been present in the pond but *C. lemnae* survived nevertheless. Again, damage to floating leaves of water lilies was found (Fig. 2), but those of *Hydrocharis morsus-ranae* L. (Fig. 3) and *Stratiotes aloides* L. (Figs. 3 and 4) were also damaged. Under water *C. lemnae* larvae also damaged leaves of *Potamogeton lucens* L.

In general, damage patterns of phytophagous insects are highly characteristic and can be recognized at first glance. Therefore it is useful to describe and

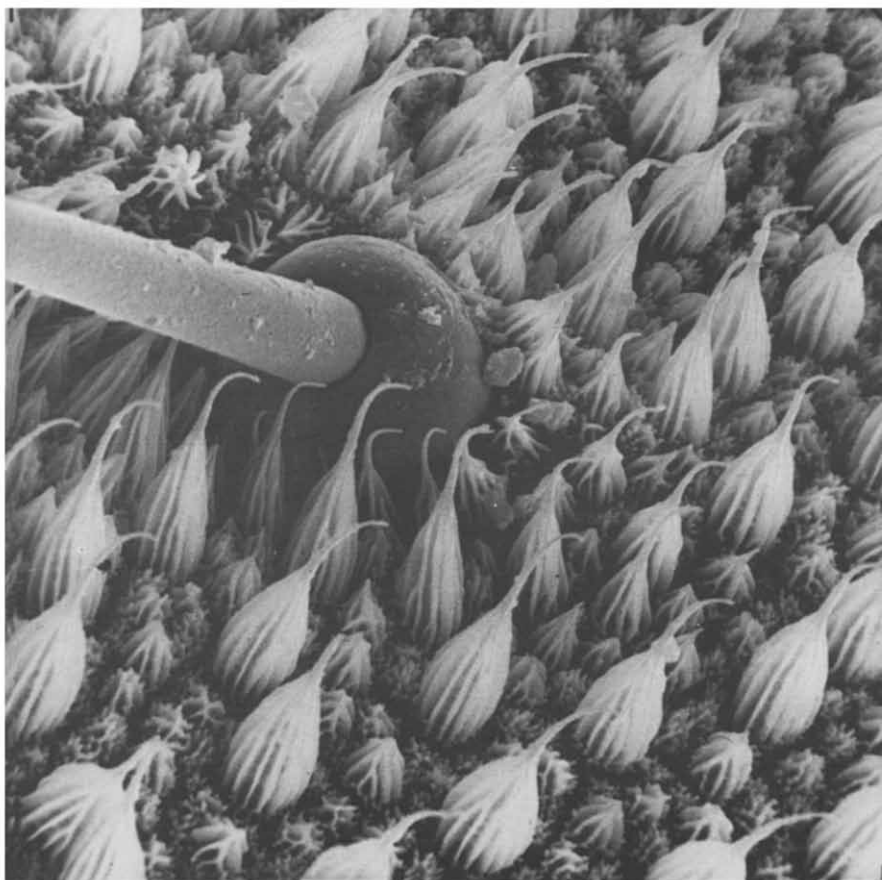


Fig. 1. SEM photograph of the skin of a final stage hydrophobous caterpillar of *Cataclysta lemnata* (L.) showing the dense hair cover which maintains a sheath of air around the body for respiration under water (plastron). Three types of hairs can be distinguished in the photograph, viz. one large tactile hair, numerous cone-shaped protuberances ending in a hair and shorter cone-shaped asterisk-like protuberances (enlargement $\times 2280$).

to illustrate these patterns. The damage by caterpillars of *C. lemnata* can be easily distinguished from that of *Nymphula nymphaeata*, because no large oval pieces are cut out from the leaf margins (Lammens and van der Velde, 1978), but only small parts. On the lower sides of the floating leaves of water lilies *C. lemnata* larvae scraped off the plant tissue superficially, resulting in many small spots (Fig. 2). Damage to the *Stratiotes* plants was more drastic as all emerging leaves were gnawed off at the water surface (Fig. 4), so that the originally emerged leaf parts floated on the water surface and could be consumed by the hydrophobous larvae (Fig. 3). From observations in outdoor concrete tanks it

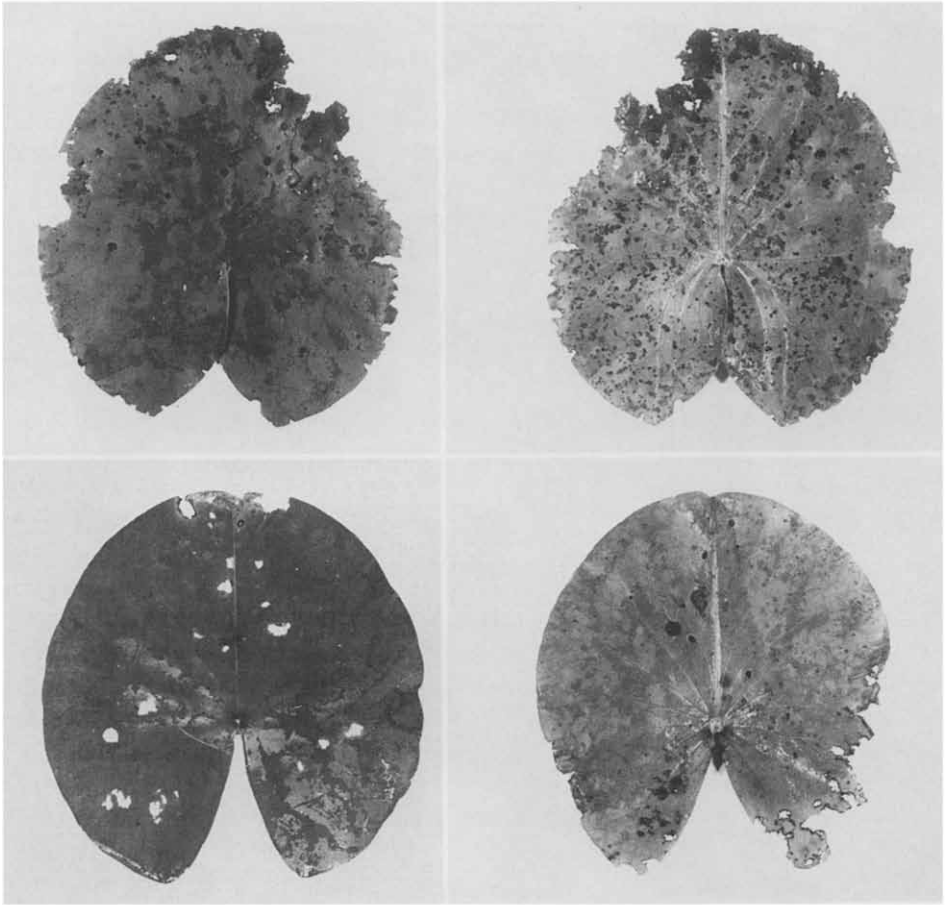


Fig. 2. Water lily leaves damaged by hydrophobous larvae of *Cataclysta lemnata* (L.). Left upper sides, right lower sides. Above: *Nymphaea candida* Presl. Below: *Nymphaea alba* L. Note the superficially scraped spots on the lower surfaces of the floating leaves.

could be concluded that *C. lemnata* has at least two generations per year (two peaks in the damage done to the floating leaf blades of *Nymphoides*), which is in accordance with the observations made by Müller (1892).

My own observations showed that *C. lemnata* larvae could eat leaf parts as soon as they unfolded at the water surface, but that in the case of *Nymphoides* leaves the greatest increase in damage occurred on 3-week-old leaves, in contrast to the damage caused by *Nymphula nymphaeata* larvae, which was worst from the moment when the leaves had just unfolded until they were 1 week old. *C. lemnata* larvae damaged even 8-week-old *Nymphoides* leaves, while for *Nymphula nymphaeata* 6-week-old leaves were the limit (van der Velde and

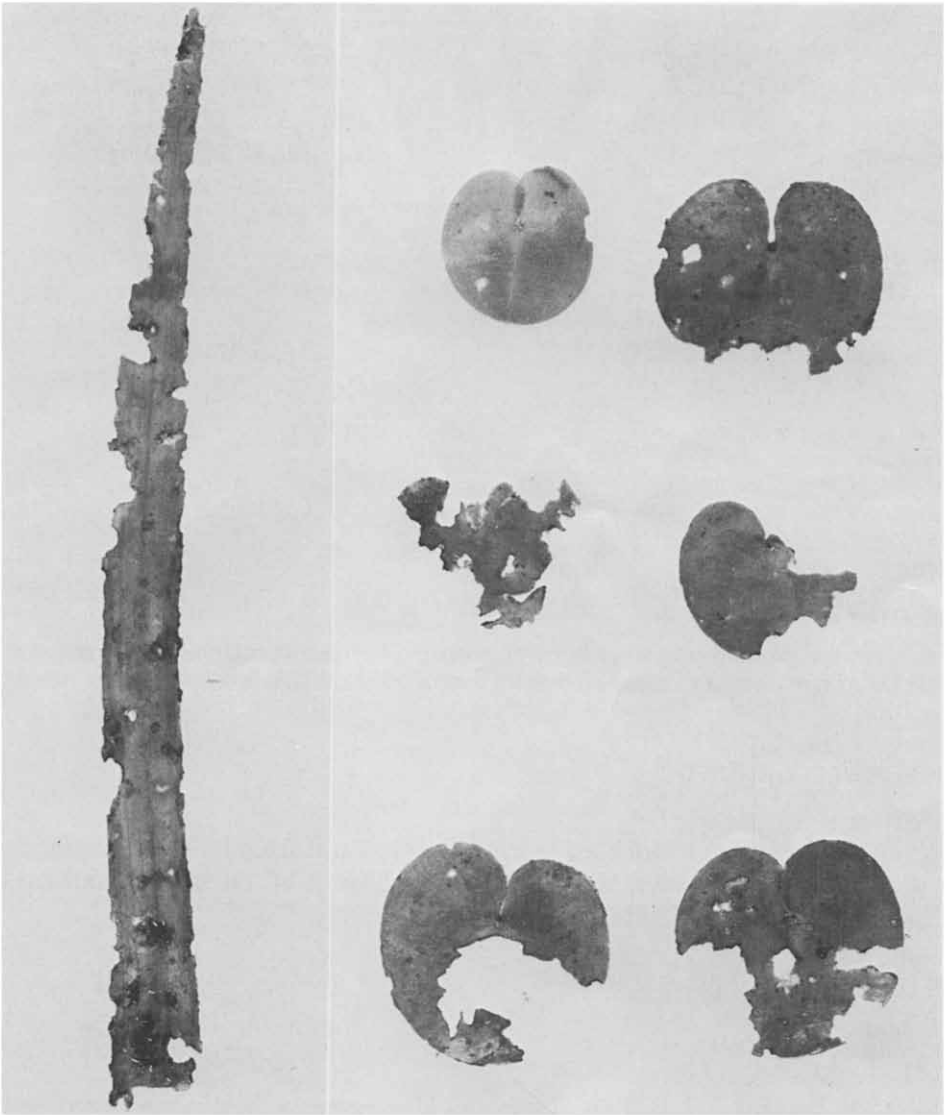


Fig. 3. Leaves of *Stratiotes aloides* L. (left) and of *Hydrocharis morsus-ranae* L. (right) damaged by hydrophobous larvae of *Caticlysta lemnata* L.

Van der Heijden, 1985). This may be an indication that *C. lemnata* is less able to tackle fresh nymphaeid material than *Nymphula nymphaeata*. In the garden pond *Nymphula* is now absent and *C. lemnata* has replaced this species, consuming the same food plants as the former species.

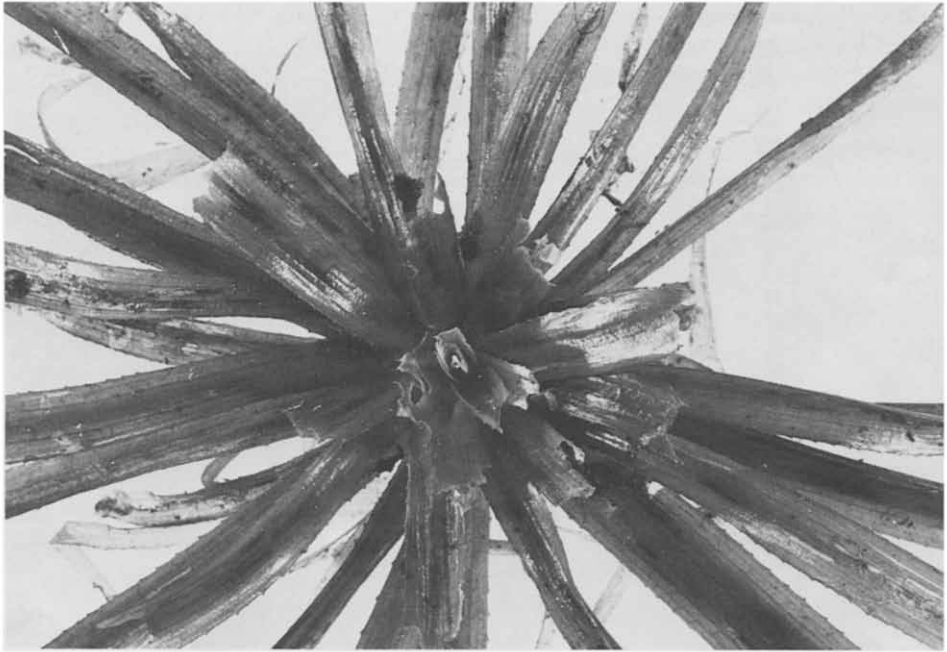


Fig. 4. Plant of *Stratiotes aloides* L. heavily damaged by hydrophobous larvae of *Cataclysta lemnata* L. Emerged leaves are gnawed off near the water surface and then consumed further (see also Fig. 3).

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