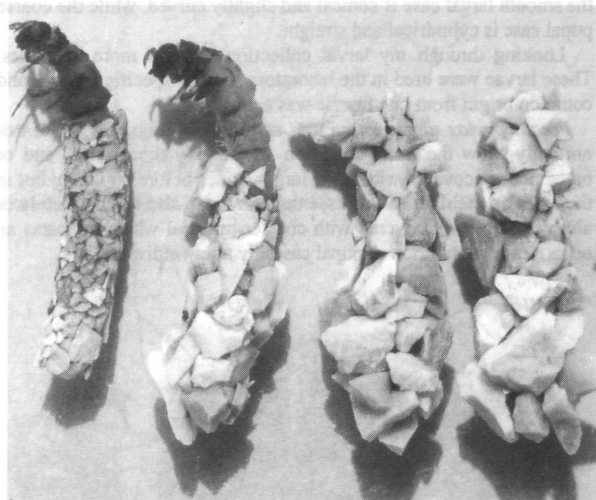


is normal in these species. The same may be true for *Micropterna nycterobia* MCL. and *M. sequax* MCL. In some cases in the latter one may see the progressive replacement of fine by coarse stones, but the total length of the case remains more or less the same. This means that the pupal case is not necessarily constructed in a short time, but takes longer while the posterior end is bitten off in separate smaller portions.



Allogamus mendax (Gd.St.Bernard, Switzerland)



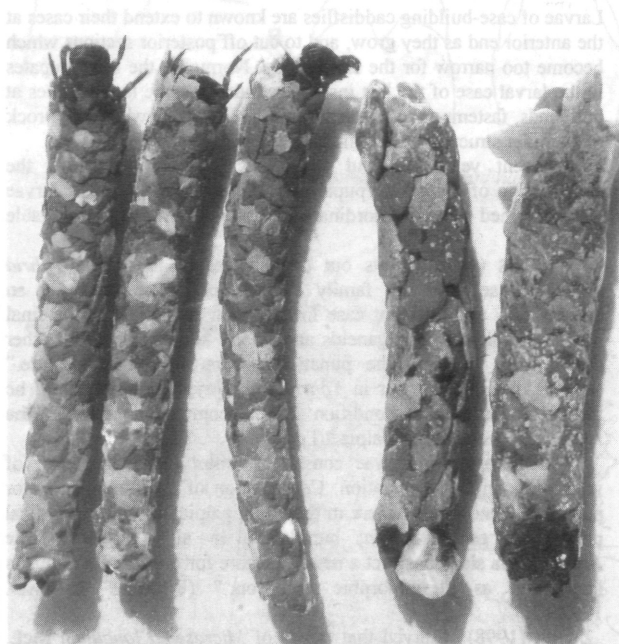
Micropterna sequax (Bretagne, France)

In other species, e.g. the very common *Allogamus auricollis* PICTET, I found no trace of a separate pupal case. The pupa is found in the larval case of the last instar.

Long larval cases do not necessarily mean the construction of a separate pupal case. *Allogamus pertuli* MAL., a remarkable Greek winter-flying species, has unusual long larval cases. Before pupation they are cut, but no new construction occurs.

From these observations it is evident that construction of pupal cases is found in many Limnephilidae, but it is performed in various ways. Even among specimens from the same mother, some may build a pupal case and some may retain the larval case or part of it. This is the result of an earlier or later stop by different individuals in adding coarse stones and removing the posterior end. In *Micropterna taurica*, the pupal case is built quickly and the larval case is cut off as a whole, but in *Allogamus uncatius* and *mendax* this happens in stages. However, indications of such behaviour were also found in *Halesus digitatus* and *Potamophylax nigricornis*.

It is likely that the construction of a separate pupal case occurs in many species in other families where it has been overlooked. At the present state of our knowledge it is clear that caddis larvae with this behaviour do not constitute a monophyletic group. Workers are free to speculate about phylogeny, and certainly behavioural and anatomical as well as eidonomical characters are equally acceptable for phylogenetic study. However, it must be pointed out that behavioural characters to be analysed are the details of behaviour, such as inherited motions and programmes performed by the animals themselves. The products such as cases, nets and the like, are not suitable for this purpose. This point is unfortunately often overlooked.



Allogamus pertuli (Karpenision, Greece)

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