

**NEW WHITE-CLAWED CRAYFISH *AUSTROPOTAMOBIUS PALLIPES*  
(LEREBoullet, 1858) OCCURRENCES IN CARINTHIA,  
AUSTRIA.**

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**ABSTRACT**

In Austria, the white-clawed crayfish, *Austropotamobius pallipes* (Lereboullet, 1858), was known only from the Gitsch Valley, a side valley of the Gail Valley in the Drave drainage. Four new sites of this species have been recently discovered in Carinthia outside the Gitsch Valley, two in the Gail Valley and two in the Drave Valley. Data from these suggest that the Carinthia's white-clawed crayfish form a part of the *A. pallipes italicus* complex without being independent under the variety name, "var. *carinthiacus*". These findings also suggest new biogeographical questions regarding Carinthia's crayfish.

**Key-words** : *Austropotamobius pallipes*, white-clawed crayfish, geographical distribution, taxonomy, Austria.

**NOUVELLES STATIONS DE L'ÉCREVISSE À PIEDS BLANCS  
*AUSTROPOTAMOBIUS PALLIPES* (LEREBoullet, 1858)  
EN CARINTHIE, AUTRICHE.**

**RÉSUMÉ**

En Autriche, la présence de l'écrevisse à pieds blancs, *Austropotamobius pallipes* (Lereboullet, 1858), était connue uniquement dans la vallée de Gitsch, une vallée affluente de la vallée de la Gail dans le bassin de la Drave. Récemment en Carinthie, quatre nouvelles stations hors de la vallée de Gitsch ont été découvertes, deux dans la vallée de la Gail et deux dans la vallée de la Drave. Les données fournies par ces animaux laissent suggérer que les écrevisses à pieds blancs de Carinthie forment une partie du complexe *A. pallipes italicus* sans être indépendantes sous le nom de variété "var. *carinthiacus*". Ces nouvelles informations posent également des questions biogéographiques à résoudre.

**Mots-clés** : *Austropotamobius pallipes*, écrevisse à pieds blancs, répartition géographique, taxonomie, Autriche.

## INTRODUCTION

The white-clawed crayfish *Austropotamobius pallipes* (Lereboullet, 1858) is a small species of crayfish, widely distributed throughout southern and western Europe, including Germany (LAURENT, 1988 ; DEHUS, 1995). However, for Austria, this animal was known to live only in the Gitsch Valley (Gitschtal), in western Carinthia (ALBRECHT, 1980, 1981 ; WINTERSTEIGER, 1983, 1985 ; PRETZMANN, 1988).

The Gitschtal is a side valley of the Gail Valley (Gailtal) in the Drave (=Drau) drainage belonging to the Danube basin. The main river in this region of Carinthia is the Drave. At Villach it receives a big tributary, named the Gail. The Drave River above Villach is divided into several valleys : the Unterdrautal (Lower Drave Valley) between Villach and Möllbrücke and the Oberdrautal (Upper Drave Valley) between Möllbrücke and Lienz. Combined these are called the Drautal (Drave Valley). Valleys of the Gail River above Villach include the Untergailtal (Lower Gail Valley) between Villach and Hermagor and the Obergailtal (Upper Gail Valley) between Hermagor and Kötschach. Together these two are called the Gailtal. Also at Hermagor, the Gail River receives a tributary, the Gössering River, whose valley is named the "Gitschtal".

Crayfish in this region were well studied by ALBRECHT (1980, 1981) and WINTERSTEIGER (1985). The white-clawed crayfish was known only from the Gitschtal and nowhere else. In consequence, *A. pallipes* has been officially classed as a "rare species" in Austria (PRETZMANN, 1983). Recently, however, this species has been found in Tyrol, it probably originated from an introduction by man in the early XXth century (FUEREDER and MACHINO, 1995). Other new sites were also discovered in Carinthia during the 1994-1995 investigations, which produced two species observed, white-clawed crayfish and stone crayfish *Austropotamobius torrentium* (Schrank, 1803). The following notes briefly describe the localizations of crayfish sites inspected during these investigations, species found and considerations on Carinthia's white-clawed crayfish.

## METHOD

Collecting information was done by contacting local people. Topographic maps (Österreichische Karten 1/50 000) were also helpful to find likely crayfish waters. The animals were caught by hand.

## RESULTS

Investigations during the summers 1994-1995 revealed the following crayfish sites (Figure 1).

**Site 1** : no name brook near the Grünburg bus-stop, a left bank tributary of the Gitschtal (680 m above sea-level ; 46°39'01"N, 13°20'19"E). Species : *A. pallipes*. This site was investigated in 1994 (MACHINO and FUEREDER, 1996). Six individuals were conserved.

**Site 2** : Stoffelbauer Spring in the Gitschtal (760 m a.s.l. ; 46°40'49"N, 13°16'42"E). Species : *A. pallipes*. This spring was inspected in 1994 (MACHINO and FUEREDER, 1996). No animal was conserved.

**Site 3** : no name brook near the Reisach railway-station in the Obergailtal (625 m a.s.l. ; 46°38'41"N, 13°09'14"E). Species : *A. pallipes*. The animals at this site were studied

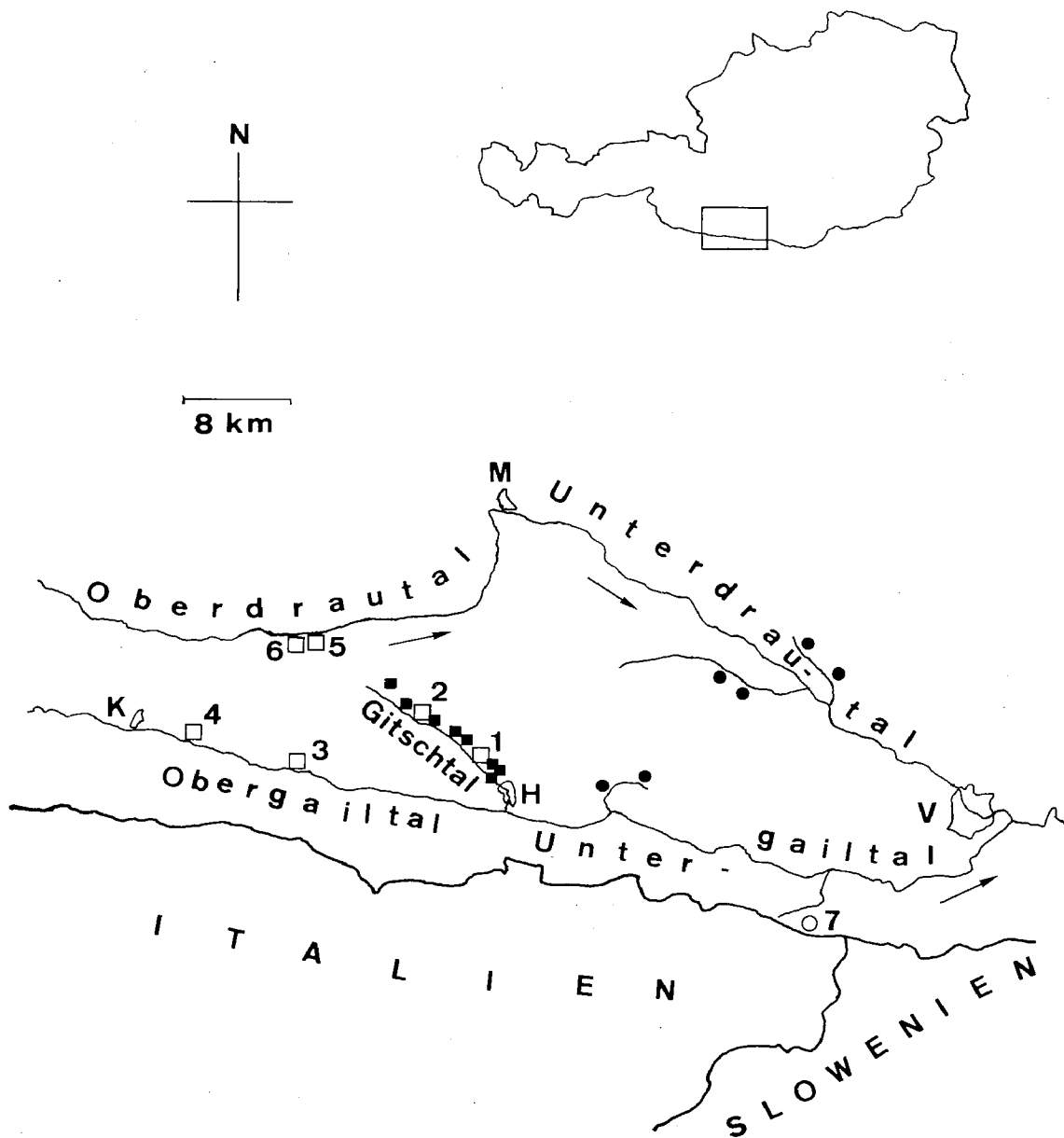


Figure 1

Distribution of *Austropotamobius* spp. in western Carinthia (Austria). White and black squares : *A. pallipes*. White circle and black circles : *A. torrentium*. Black squares and circles : ALBRECHT (1980, 1981) and WINTERSTEIGER (1985). White squares and white circle : present study, 1 : the Grünburg bus-stop, 2 : Stoffelbauer, 3 : Reisach, 4 : the Krebsenbach, 5 : Bruggen, 6 : Amlach, 7 : the Zainer Bach. Local towns, H : Hermagor, K : Kötschach, M : Möllbrücke, V : Villach. *A. pallipes* lives in the Gitschtal, Obergailtal and Oberdrautal. *A. torrentium* lives in the Untergailtal and Unterdrautal (see text for the precise localizations).

Figure 1

Répartition d'*Austropotamobius* spp. en Carinthie occidentale (Autriche). Carrés blancs et noirs : *A. pallipes*. Cercle blanc et cercles noirs : *A. torrentium*. Cercles et carrés noirs : ALBRECHT (1980, 1981) et WINTERSTEIGER (1985). Cercle blanc et carrés blancs : la présente étude, 1 : l'arrêt de bus de Grünburg, 2 : Stoffelbauer, 3 : Reisach, 4 : le Krebsenbach, 5 : Bruggen, 6 : Amlach, 7 : le Zainer Bach. Villes locales, H : Hermagor, K : Kötschach, M : Möllbrücke, V : Villach. *A. pallipes* se trouve dans les Gitschtal, Obergailtal et Oberdrautal. *A. torrentium* se trouve dans les Untergailtal et Unterdrautal (voir le texte pour les localisations précises).

in 1994, when five individuals were conserved (MACHINO and FUEREDER, 1996). A 19th August 1995 night-time observation enabled me to see about 50 individuals sized between 3 and 9 cm (rostrum-telson).

**Site 4 :** the Krebsenbach (crayfish brook) at Sankt Daniel in the Obergailtal (735 m a.s.l. ; 46°40'02"N, 13°03'16"E). Visited on 20th August 1995. Species : *A. pallipes*. Three individuals (one male of 10.8 cm, two females of 9.0-9.1 cm) were captured, photographed and released unharmed. The site is a pond, forming headwaters of the Krebsenbach. The inspection was carried out in the day-time (weather : cloudy), but many crayfish were outside without hiding themselves. This may be due to a scarcity of predators (*e.g.* fish) in the pond, as the pond owner indicated that fish were no longer being stocked (W. DABERER, 1995, oral comm.). The owner also said that these crayfish were native to this water. The population seems large.

**Site 5 :** no name brook coming down from Kalch, near Bruggen, in the Oberdrautal (595 m a.s.l. ; 46°44'06"N, 13°10'31"E). Species : *A. pallipes*. Inspected on 21st August 1995 in the day-time. Caught some small individuals (released), one adult male (conserved, 8.45 cm) and one soft-shelled adult female (released). The population seems small.

**Site 6 :** no name brook near Amlach in the Oberdrautal (595 m a.s.l. ; 46°44'06"N, 13°09'59"E). Species : *A. pallipes*. Inspected on 21st August 1995 in the day-time. Found one female *exuvia*. Caught two males : one kept (7.2 cm) and one released unharmed. The inspection was not easy because of swamp and bushes.

**Site 7 :** the Zainer Bach (Zainer Brook), a tributary of the Gailitz River, at Seltschach near Arnoldstein in the Untergailtal (740 m a.s.l. ; 46°32'00"N, 13°40'28"E). Species : *A. torrentium*. Inspected on 20th August 1995 in the day-time. Conserved eight adults (four males of 7.3-7.65 cm and four females of 7.0-7.35 cm). The crayfish population of the Zainer Bach is native and not an introduced one (H. SCHNABL, 1995, oral comm.). The population seems very dense.

## GEOGRAPHICAL DISTRIBUTION

Investigations in the summers 1994-1995 produced seven sites where crayfish were observed. The Gitschtal : two sites with *A. pallipes* (sites 1 and 2) ; the Gailtal : two sites with *A. pallipes* (sites 3 and 4) and one site with *A. torrentium* (site 7) ; and the Drautal : two sites with *A. pallipes* (sites 5 and 6).

The presence of *A. pallipes* in the Gitschtal has already been well known and they form many large populations in left bank tributaries of the Gitschtal (ALBRECHT, 1980, 1981 ; WINTERSTEIGER, 1985 ; PRETZMANN, 1988).

The presence of stone crayfish (*A. torrentium*) in a water of the Gail drainage is not strange, because it belongs to the Danube basin where *A. torrentium* is widely distributed (ALBRECHT, 1980, 1981, 1982, 1983 ; WINTERSTEIGER, 1985 ; LAURENT, 1988). Therefore, the presence of stone crayfish in the Zainer Bach simply adds one new site to a long list of stone crayfish sites.

Until recently the Obergailtal had many *A. pallipes*, but none could be found after about 1970 and the species was believed to be extinct from the Gailtal (ALBRECHT, 1980, 1981). The recent discovery of two sites (Reisach and the Krebsenbach), separated by 8 km, supports ALBRECHT's assumption that formerly the Gailtal, particularly the Obergailtal, formed a large distribution area for *A. pallipes*.

According to local people, the Drautal, precisely the Oberdrautal, seems to have had some crayfish at every junction of the Drave River with its tributaries till about 1970, but these animals are now extremely rare, if not already extinct. Fortunately, the presence of crayfish in 1995 was observed at two sites. But the presence of *A. pallipes* was totally unexpected in this area, where the stone crayfish or the noble crayfish *Astacus astacus* (Linnaeus, 1758) was logically expected because the drainage belongs to the Danube basin.

## TAXONOMY

By analyzing the morphology of crayfish, ALBRECHT (1980, 1981, 1982) concluded that the Gitschtal populations did not belong to other varieties (*sensus* ALBRECHT 1980, 1982), *e.g.*, *Astacus pallipes* var. *trentinicus* (*sic*) or *Astacus pallipes* var. *italicus* (*sic*), but they formed an independent variety, *Astacus pallipes* var. *carinthiacus* (*sic*), and this without taking into account those from the Gailtal and Drautal which he was not aware of. According to him, the most distinctive characteristics of *A. p.* var. *carinthiacus* were : chocolate-brown colour on the upper side of the chelae, high numbers of spines on the third maxilliped merus (mostly 7 and 8) and behind the cervical groove (mostly between 3 and 6).

The results of our 1994 investigation at Reisach (Gailtal) supported ALBRECHT's assumption, as a valid variety of *A. p.* var. *carinthiacus*, in spite of a minor difference in the number of spines behind the cervical groove (MACHINO and FUEREDER, 1996).

However, taking into account the results from 1994 and 1995, *i.e.* when all crayfish available from the Gitschtal, Gailtal and Drautal (which are believed to form one taxon) are observed, a morphological difference between ALBRECHT's strict definition of *A. p.* var. *carinthiacus* and the observed Carinthian white-clawed crayfish appears. Therefore, in spite of a small sample size for statistical validity, the number of spines on the third maxilliped merus (13 individuals) and behind the cervical groove (16 individuals) was counted (Figure 2). The merus has a high number of spines (mode : 9 spines) similar to that of ALBRECHT's results (7-8 spines). This number is very high, in comparison with that (3-6 spines) of crayfish from outside Carinthia. Only those from northern Italy have numbers (5-7 spines) closer to this (see ALBRECHT, 1980 for data). The cervical groove has mostly one or three spines, while ALBRECHT's criterion indicates mostly three to six spines. The colour of the upper side of chelae which ALBRECHT (1981) said is chocolate-brown, seemed to vary in our samples from darker to lighter tones, while remaining more or less chocolate-brown. Crayfish of other regions can also have a colour close to Carinthia's chocolate-brown, as seen in white-clawed crayfish from Slovenia (MACHINO, 1995, pers. observ.). ALBRECHT (1980, 1981) admitted that morphologically the Carinthian crayfish had certain similarities with *A. pallipes* of Italy and the former Yugoslavia.

Therefore, because the morphology of *A. pallipes* can overlap with those from northern Italy and Slovenia, it may be rather better not to make an independent variety of "Carinthia's *A. pallipes*" while data are insufficient. PRETZMANN (1988) regards the Carinthia crayfish as the same as the Italian crayfish, *Pontastacus (Austropotamobius) pallipes fulcisianus* (*sic*). However, the taxonomy of the Italian crayfish is not yet resolved (BOTT, 1950, 1972 ; KARAMAN M.S., 1962 ; ALBRECHT, 1980, 1982). Members of the Italian crayfish group have been found in Switzerland (Graubünden and Ticino), Italy, Slovenia, Croatia, and Bosnia-Herzegovina. Austria should now be added to this list. White-clawed crayfish from all these areas belong to the *Austropotamobius pallipes italicus* complex.

Further studies on Carinthian crayfish can certainly lead to its true taxonomic status. But these studies should be carried out very carefully, because of the small size of some



of these populations. Particularly, those from Reisach and Bruggen should not reduce their population size, where a lethal sampling of a sufficient number of animals for statistical validity (30 individuals) can lead these populations towards extinction. Sampling from populations in the Gitschtal and the Krebsenbach may be possible if the number collected is reasonable for the populations to recover. I have no idea about the population size of the Amlach crayfish.

## CONCLUSION

Among the authors who cited the presence of *A. pallipes* in the Gitschtal of Carinthia, it seems that only ALBRECHT (1980, 1981) actually inspected the region and visited sites with and without white-clawed crayfish. When the Gitschtal's *A. pallipes* was discovered in 1977, it was a kind of "scoop" that it occurred in the Danubian water. Furthermore, this species was formerly abundant in the Obergailtal, while scientific communities were not aware of it. Unfortunately, during the 1977-1978 campaigns, ALBRECHT did not find *A. pallipes* outside the Gitschtal and he therefore did not document the presence of *A. pallipes* in the Obergailtal and other areas.

However, our investigations of 1994-1995 in Carinthia show that the white-clawed crayfish is still present in the Obergailtal, confirming that the Obergailtal was formerly a large distribution area for this species. Another important result of our investigations was the discovery of new locations for *A. pallipes* in the Oberdrautal. Thus, the white-clawed crayfish was discovered in the Gitschtal in 1977, the Obergailtal in 1994 and the Oberdrautal in 1995, an even wider distribution than ever thought.

At the same time, it is already known that the Untergailtal and Unterdrautal have the stone crayfish (ALBRECHT, 1980, 1981 ; WINTERSTEIGER, 1985 ; Figure 1). An important note here is that the stone crayfish and the white-clawed crayfish do not live sympatrically, and their distribution areas do not overlap except in very few rivers of the Adriatic coast of the former Yugoslavia (KARAMAN S., 1929 ; LAURENT, 1988).

The presence of the white-clawed crayfish in the Gitschtal, Obergailtal and Oberdrautal, and the stone crayfish in the Untergailtal and Unterdrautal, is totally inexplicable. As vital data are missing, any assumption cannot be put forward. There is an urgent need for additional data, particularly about detailed distributions for the both species in this region and on their ecology/ethology about interspecific competition, if any.

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