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Parasitology is a tool for identifying the original biotope of the gibel carp (*Carassius auratus gibelio* Berg, 1932)

Parazitológiai bizonyítékok az ezüstkárász (*Carassius auratus gibelio* Berg, 1932) eredetéről

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Abstract

At this time the occurrence of three *Carassius* taxa (*C. carassius, C. auratus auratus* and *C. auratus gibelio*) are known from Europe. Crucian carp [*Carassius carassius* (Linnaeus, 1758)] is a native fish species in European waters. The goldfish, a species of Chinese origin arrived to Europe long time ago, and at the time when Linnaeus in 1758 published his Systema Naturae he described two *Carassius* species, the crucian carp as *Cyprinus carassius* and the goldfish as *Cyprinus auratus*. During the last two centuries 13 other *Carassius* spp. were described which proved to be synonymous of *C. carassius* and 3-3 species as synonymous of *Carassius auratus auratus* and *C. auratus gibelio,* respectively. The authors confute the European origin of *Carassius gibelio* Bloch, called as Prussian carp. They compared infections of the gibel carp and goldfish with myxosporeans in Europe and in the Far-East and found that these fishes in the Far-East have been infected by several host specific *Myxobolus* and *Thelohanellus* species, while in Europe of them only a single species is known. Great differences in the range of myxosporean spp. suggest that both gibel carp and goldfish are Far-East origin fishes which arrived to Europe in the historical times. The identical myxosporean fauna of the gibel carp (*Carassius auratus gibelio*) and goldfish (*Carassius auratus auratus*) also shows that they are subspecies of *Carassius* (*Cyprinus auratus*) described by Linnaeus.

Kivonat

Európában jelenleg három *Carassius* taxa (*C. carassius, C. auratus auratus* and *C. auratus gibelio*) előfordulása ismert. Közülük a széles kárász [*Carassius carassius* (Linnaeus, 1758)] mint Európában őshonos halfaj ismert. Az aranyhal egy kínai eredetű halfaj néhány évszázada érkezett Európába, és amikor Linnaeus 1758-ban publikálta a Systema Naturae művét abban két *Carassius* faj, a széles kárász és az aranyhal előfordulását jegyezte fel *Cyprinus carassius,* illetve *Cyprinus auratus* néven. Az utóbbi két évszázadban további 13 *Carassius* fajt ítak le, melyek később *a C. carassius* szinonimáinak bizonyultak. További 3-3 faj a *Carassius auratus auratus* ill. az ezüstkárász *C. auratus gibelio* szinonimájának bizonyult. A szerzők a porosz ponty (*Carassius gibelio* Bloch) európai eredetét a kárász fajok távol-keleti és európai nyálkaspórás-parazitafaunájának összevetésével cáfolják. A Távol-Keleten az ezüst kárászt és az aranyhalat számos *Myxobolus* és *Thelohanellus* faj fertőzi, Európában ezek közül csak egyetlen faj ismert. A nyálkaspórás fajok arányában lévő különbségek arra utalnak, hogy az ezüstkárász és aranyhal távol-keleti eredetűek és Európába emberi segítséggel a történelmi időkben érkeztek. Az aranyhal és az ezüstkárász azonos parazitája arra utal, hogy az ezüstkárász (*Carassius auratus gibelio*), valamint az aranyhal (*Carassius auratus auratus*) Linnaeus által leírt *Carassius* (*Cyprinus*) *auratus* alfajai.

Introduction

Gibel carp, this commonly occurring fish in the Far-East freshwaters, is an aggressively invasive fish species in the Danube region since the second half of the twentieth century. Its European origin is a vexed question among ichthyologists. Some of the specialists (e.g. Kottelat & Freyhof 2007, Froese & Pauli 2018) still accepts that the species is identical with that one described in Prussia by Bloch (1782) as *Cyprinus gibelio,* and they suggest of designating the fish as Prussian carp [*Carassius gibelio* (Bloch, 1782)]. At the other side some authors (e.g. Berg 1932, 1964, Hensel 1971) think that the fish is of Far-East origin, and it is a subspecies of the goldfish [*Carassius auratus* (Linnaeus, 1758)]. They prefer naming the fish as gibel carp, allogynogenetic crucian carp or silver crucian carp (*Carassius auratus gibelio* Berg, 1932). Their view seems to be strongly supported by Kalous et al. (2004), who after re-examining the type specimen of *Carassius gibelio* (Bloch, 1782) in the Natural History Museum in Berlin found that the type specimen was a *Carassius carassius* (Linnaeus, 1758). Hensel (1971) thought that the fish described as gibel carp were in most case goldfish specimens run wild from aquaria. Lelek (1987) supposed that the gibel carp could be accidentally got to Europe with the goldfish but he have not even precluded, that the fish was accurately populated to European waters. Pintér (1980) reported that the gibel carp was first introduced to Hungary in 1954 from Bulgaria. Present authors think that the *Carassius* sp. described by Bloch (1782) as gibel carp (*Cyprinus gibelio*) was a malformed morphological variation of the crucian carp, therefore it is a synonym of *Carassius carassius*. Summary of synonyms of taxa of the genus *Carassius* are presented in *Table 1*. The fish species which at this time is called as gibel carp was introduced to Europe only in the last century. The gibel carp, this commonly occurring fish in the Far-East freshwaters, is an aggressively invasive fish species in the Danube region living here since the second half of the twentieth century. During its expansion gibel carp forced the native crucian carp into isolated refugees in its newly conquered territories. The fact that gibel carp this invasive fish did not spread fast from Prussia to other parts of Europe and even this time it is not inhabitant of that region contradicts to its existence in Bloch's ages. Though these facts seem unanimously prove the Asian origin of the gibel carp, present authors by comparing the parasite fauna of the European and Asian population of the gibel carp presents further evidences in this matter. A similar work was published recently on the Asian origin of the common carp by Molnár (2009), who comparing the parasitic infection of the European common carp (*Cyprinus carpio* Linnaeus 1758) and the Asian common carp provided similar data.

Examination of the parasite fauna is a useful tool for identification of the origin of small fish groups or a whole population in Oceans (MacKenzie, 2002). By this method spooning places of Pacific Ocean fishes in small rivers of Alaska or Kamchatka could exactly be outlined (Arthur & Albert 1993, Konovalov 1995, Timi, 2007). In this respect host specific parasites, may play a specific role, due to the fact that in general these introduced fishes in the new habitat harbour less number of specific parasites than in the original biotope (Torchin et al. 2003). Sagarin et al. 2006) described, that according to the parasite/predator escape hypothesis, an introduced species may profit from the favorable situation in the new habitat, and attains higher population densities and greater individual sizes in the colonized areas compared to the conspecifics in their native range. On the other hand, Prenter et al. (2004) thought that introduced hosts may bring with them all or a subset of their native parasite fauna into the new area or they may even adopt local parasites. The importance of parasites has also been recognized in invasions when native host populations are infected by a new parasite transported with introduced host (Vooren 1972, Moravec & Taraschewski 1988). In most case the advantage of a new species at a new habitat comes from the fact that the introduced species left the majority of its specific parasites and pathogens in the native habitat.

Most of the parasites can be used as tools, but species with strict host specificity or species infecting only some closely related fishes are the best for this purpose. Among these

parasites the host specific species of Monogenea and Myxosporea deserve a special attention.

Table 1. Synonyms of taxa of the genus Carassius
1. táblázat. A Carassius nembe tartozó taxonok szinonimái

Taxon	Author and date/Leíró és dátum
Carassius carassius	**(Linnaeus, 1858)**
C. auratus wui	Tchang, 1930
C. carax	(Lesniewski, 1837)
C. coeruleus	Basilewski, 1855
C. discolour	Basilewski, 1855
C. gibelio minutes	(Kessler, 1856)
C. humilis	Heckel, 1837
C. limnaei	Bonaparte, 1845
C. limnei	Malm, 1877
C. moles	Nordmann, 1840
C. oblongus	Hecket et Kner, 1858
C. pekingensis	Basilewsky, 1855
C. vulgaris	Nordmann, 1840
C. vulgaris subventrosus	Walecki, 1863
Carassius auratus auratus	**(Linnaeus, 1758)**
C. auratus cantonensis	Tchang, 1933
C. chinensis	Gronow, 1854
C. encobia	Bonaparte, 1845
Carassius auratus gibelio	**Berg 1932**
C. ellipticus	Heckel, 1848
C. vulgaris kolenti	Gronow, 1854
C. vulgaris ventrosus	Walecki, 1863

In this paper, besides historical data and field observations by analysing the myxososporean infections of Asian and European gibel carp parasitological evidences are presented which show that the parasite fauna of the Far East gibel carp stock is significantly richer in species than that of the European gibel carp. The parasitic infection of the gibel carp in Europe harbours only a small part of species infecting this fish in Chinese waters.

Material and methods

A systematic research on the parasite fauna of fishes including *Carassius* spp. started in Hungary in 1960. Since this time the parasitic infection of freshwater and pond-cultured fishes has been regularly surveyed, and all parasitic groups infecting fishes have been concerned. During these surveys complete parasitological dissections were performed; histological sections from the collected material were prepared; samples from parasites were preserved in alcohol or as slide preparations; photos and video images were recorded. A special attention was paid to parasites of invasive fishes (gibel carp, brown bullhead [(*Ameirus nebulosus* (Lesueur, 1819)], pumpkinseed [(*Lepomis gibbosus* (Linnaeus, 1758)], Ponto-Caspian gobies), the colonisation of which in the Hungarian fauna took place in the last century, or to parasites infecting fishes which were regularly introduced during these ages such as European eel [*Anguilla anguilla* (Linnaeus, 1758)], goldfish, koi-carp, silver carp [*Hypophthalmichthys molitrix* (Valenciennes, 1844)], bighead carp [*Hypophthalmichthys nobilis* (Richardson, 1845)] and grass carp [*Ctenopharyngodon idella* (Valenciennes, 1844)]).

Data to the present paper have been collected from the records of the authors since 1960. In the first years of investigations rivers and lakes between the Danube and Tisza and the Pannonian region of Hungary were populated only with the crucian carp. In 1960 to 1964 32 specimens of 7 to 20 cm long crucian carp were studied for parasitic infection.

Investigation of the parasite fauna of the gibel carp started in 1964 in the ponds and dead arms of the Hármas-Körös River in Szarvas (East Hungary, where some years before this fish species was introduced from Bulgaria). From 1964 to 1984 parasites of 42 specimens of 3 to 26 cm long gibel carp were studied in this habitat and up to 2006 further 21 specimens were examined from different territories of Hungary. Parasitic infection of the goldfish was studied in the Temperate Water Fish Hatchery, in Százhalombatta (near to Budapest), where the goldfish was cultured in ponds. Of this fish species 44 specimens of 3 to 15 cm long goldfish were examined from 1987 to 2006. In 2007 10 specimens of crucian carp collected from isolated ponds (refugies) of south-west Hungary were also examined for parasites.

Results and discussion

Some fish species as the pumpkinseed, brown bullhead arriving from North America became the member of the European fish fauna due to unconsidered fish introductions more than 150 years ago. These fishes enriched the parasite fauna in Europe with some monogeneans as *Cleidodiscus pricei* Mueller, 1936 or *Haplocleidus dispar* (Mueller, 1936) and *H. similis* (Mueller, 1936) (Roman 1960). The expansion of the Ponto-Caspian gobies takes places in these days conquering the whole Danube region and inhabiting even the northern part of the American continent. Their expansion is partially an active invasion but ballast water of ships contributes to their rapid spread as well (Ahnelt et al. 1989; Jude et al. 1992). Of the specific parasites these fishes introduced only some coccidian species to the Hungarian stretches of the Danube River from the Black Sea biotope (Molnár 2006).

Eels arrived to Hungary exclusively by anthropogenic transfer, and since 1961 to 1991 in each year glass eels were introduced into Lake Balaton and some closed system water basins. Until 1990 the parasite fauna was the same as in natural ways populated rivers and lakes in Europe (Murai 1971). In the first part of the 1980th years an invasive and pathogenic nematode, *Anguillicola crassus* Kuwahara, Niimi & Itagaki, 1974 arrived to Europe due to the introduction of the Japanese eel, (*Anguilla japonica* Temminck & Schlegel, 1846), and this parasite infected the European eel and caused a heavy infection in this fish (Hartman 1987). This parasite was first detected in Hungary in 1990 (Székely et al. 1991). Another large-scale anthropochore fish transfer took place in the years of 1950th when the Amur River fishes were introduced to the European part of the former Soviet Union. At this time stocks of the Amur wild carp (*Cyprinus carpio erythropterus*), grasscarp [*Ctenopharyngodon idellus* (Valenciennes)], silver carp [*Hypophthalmichthys molitrix* (Valenciennes)] and bighead carp [*Hypophthalmichthys nobilis* (Richardson)] arrived regularly to Europe. These latter fishes introduced several pathogenic parasites to the European continent (Musselius 1967) and most of the parasites became introduced also to Hungary (Szakolczai & Molnár, 1963). This was also the period when the colour variation of the Japanese carp (koi) arrived to the Western part of Europe more frequently using the fastest way of fish transfer, the airway routs. In most cases fishes, among them herbivorous fishes introduced their specific parasites to the new biotope, where they were able to survive on their original hosts. Some of them, however, introduced some less specific parasites, as well, which were infective also to the native fishes. Of the latter the cestode *Bothriocephalus acheilognathi* Yamaguti, 1934 is the best known, which became a world-wide pathogen (Malewitzkaya 1958).

Of the introduced parasites, species of three fishes, *Cyprinus carpio haematopterus, Carassius auratus auratus* and *Carassius auratus gibelio*, deserve a special attention. These fishes after the anthropogenic breakdown of biogeographic barriers got in contact with endemic subspecies and species of their genera (*Cyprinus carpio carpio, Carassius carassius*) in the new areas, and the non-native and native species could infect each other with their specific parasites.

Table 2. Myxosporeans described from taxa of the genus Carassius
2. táblázat. A Carassius nembe tartozó taxonokból leírt nyálkaspórások

Table 2a. Myxobolus spp. described from crucian carp
2a. táblázat. Széles kárászból leírt Myxobolus fajok

Name of the parasite/Parazitafaj neve	Infected organs/ Fertőzött szerv	Fish species as described/Gazdaállat	Locality/Helyszín
Myxobolus carassii Klokachewa, 1914	liver, intest., abdominal cav.	*Carassius carassius*	Russia
M. diversus Nie & Li, 1973	gills, kidney	*Carassius carassius cuvieri*	China
M. elongatus Fujita, 1924	kidney	*Carassius carassius*	Japan
M. thelohanellus Shulman & Vikhrova, 1952	gills	*Carassius carassius*	Russia

Table 2b. Myxobolus spp. described from goldfish
2b. táblázat. Aranyhalból leírt Myxobolus fajok

Name of the parasite/Parazitafaj neve	Infected organs/ Fertőzött szerv	Fish species as described/Gazdaállat	Locality/Helyszín
M. bladderia Chen & Ma, 1998	gall-bladder	*Carassius auratus auratus*	China
M. cantonensis Chen, 1998	gills	*Carassius auratus auratus*	China
M. cultus Yokoyama, Ogawa & Wakabayashi, 1995	cartilage	*Carassius auratus*	Japan
M. echengensis Chen, 1998	kidney	*Carassius auratus auratus*	China
M. egregius Li & Nie, 1973	gills, kidney, spleen	*Carassius auratus auratus*	China
M. hearti Chen, 1998	heart	*Carassius auratus auratus*	China
M. hokiangensis Ma, 1998	ureter, urinary bladder	*Carassius auratus auratus*	China
M. huananensis Chen, 1998	skin, gills	*Carassius auratus auratus*	China
M. huchowensis Chen, 1998	gills	*Carassius auratus auratus*	China
M. kingchowensis Ma & Chen, 1998	almost all organs	*Carassius auratus auratus*	China
M. lokiaensis Chen, 1998	urinary bladder	*Carassius auratus auratus*	China
*M. nanyangensis (*Hu, 1965) Eiras et al., 2005	gills	*Carassius auratus auratus*	China
M. nanyuensis Chen, 1998	gills	*Carassius auratus auratus*	China
M. pekingensis Chen, 1998	intestine, liver, kidney	*Carassius auratus auratus*	China
M. pseudosquarae Chen, 1998	gills, caudal fin	*Carassius auratus auratus*	China
M. pyramidis Chen, 1998	gills	*Carassius auratus auratus*	China
M. qingyiensis (Myxobolus yaanensis Ma & Zhao, 1998) Eiras et al, 1965 syn.	spleen, abdominal cavity	*Carassius auratus auratus*	China
M. tachengensis Chen, 1998	gall-bladder, front intestine	*Carassius auratus auratus*	China
M. tuberculus Nie & Li, 1992	heart, urinary bladder, ureter	*Carassius auratus auratus*	China
M. tunghuensis Chen, 1998	urinary bladder, kidney	*Carassius auratus auratus*	China
M. urinarybladderi (*Myxosoma tunghuensis* Chen, 1998) Eiras et al., 2005	urinary bladder	*Carassius auratus auratus*	China
M. valatus Li & Nie, 1973	gills, intestine, kidney, skin	*Carassius auratus auratus*	China
M. wasjugani Bocharova & Donec, 1974	muscles	*Carassius auratus*	River Ob
M. wuhanensis Chen, 1998	kidney, gall-bladder	*Carassius auratus auratus*	China
M. wulii (Myxosoma magna Wu & Li, 1986) Landsberg & Lom, 1991	gills, spleen, abdominal cavity	*Carassius auratus auratus*	China
M. wushingensis Chen, 1998	kidney, intestine	*Carassius auratus auratus*	China

For studying differences in the parasite fauna of the original habitat and the new biotope two parasitic groups are the best stools, namely monogeneans and myxosporeans. Monogeneans, which develop by a direct way from fish to fish, and could be transmitted from continents to continents even by a single fish hosts, might arrived from the Far East to Europe as early as the first Portuguese sailors introduced the goldfish into Europe. Therefore, in the present paper their role has not been considered. Studying the myxosporean infection of fishes might serve more information in this respect. Myxosporeans, among them *Myxobolus* spp. develop by oligochaete alternative hosts and their colonization at a new habitat is more difficult. When comparing the *Myxobolus* fauna of the Far East *Carassius* spp. with those of the European stocks, a huge difference can be seen. From the crucian carp only 4 *Myxobolus* spp have been described (Table 2a), and only 2 of them (*M. carassii* and *M. thelohanellus*) are known in Europe. At the other side from the goldfish 26 *Myxobolus* spp, and from the gibel carp 13 *Myxobolus* spp. have been described

from the waters of China, Japan and the Amur Basin. (Table 2b,c). In Hungary only a single species (*M. carassii)* is known from the crucian carp, and another species, *M. diversus* from the goldfish (Molnár & Székely 2003). This species was later on recorded on the fins of the gibel carp, as well (Székely & Molnár unpublished data). Studying differences in parasitic infections of Carassius spp. in the Far Est and Europe another myxosporean group *Thelohanellus* gives convincing picture (Table 2d). From the Far East *Carassius* spp. 8 *Thelohanellus* spp. have been described, from Europe neither of them is known. Up to this time the occurrence of five myxosporean species is known from Hungary (Table 2 e).

The large number of *Myxobolus* spp. infecting the Far-East *Carassius* spp. and their scarce number in Europe suggest that the original habitat of the goldfish and the gibel carp was the Chinese region. In case of the goldfish it is an accepted view, in case of gibel carp, however, the Far-East origin is disputed. The fact, that a *Carassius* species was described in Europe as *Carassius gibelio* by Bloch in 1782 (Bloch 1782) seemed to support the European origin of this species. Considering, however, that the specimen described by Bloch (Bloch 1782) was indeed a crucian carp indicate that the homeland of the gibel carp should be looked for in the Chinese-Amur fauna region. Besides our data, received from studying the myxosporean fauna of *Carassius* spp, historical data prove, that the gibel carp arrived to the Carpathian Basin rather late. Knowing the aggressive invading nature of this fish one cannot accept that this fish was an original member of the European fish fauna. The gibel carp forced back the wide ranged crucian carp into remote refugees within some decades after arriving to the Danube system. No similar action was recorded in the past Prussian territories.

Table 2c. Myxobolus spp. described from gibel carp
2c. táblázat. Ezüstkárászból leírt Myxobolus fajok

Name of the parasite/Parazitafaj neve	Infected organs/ Fertőzött szerv	Fish species as described/Gazdaállat	Locality/Helyszín
M. acutus (*Sphaerospora acuta* Fujita, 1912) Landsberg & Lom, 1991	gills	*Carassius auratus gibelio*	Japan
M. alacaudatus Yukhimenko, 1986	gills, muscles, fins	*Carassius auratus gibelio*	Amur basin
M. artus Akhmerov, 1960	kidney	*Carassius auratus gibelio*	Amur basin
M. gibelio Yukhimenko, 1986	gills, fins, kidney	*Carassius auratus gibelio*	Amur basin
M. gibelioi Wu & Wang, 1982	gills	*Carassius auratus gibelio*	China
M. honghuensis Liu, Whipps, Gu & Huang, 2012	pharynx	*Carassius auratus gibelio*	China
M. kubanicus Bykhovskaya-Pavlovskaya & Bykhovski, 1940	gut, muscles	*Carassius auratus gibelio*	Kuban River
M. lentisuturalis Dyková, Fiala & Nie, 2002	muscle fibres	*Carassius gibelio*	China
M. orientalis Shulman, 1962	gills	*Carassius auratus gibelio*	China
M. platyrostris Akhmerov, 1960	kidney	*Carassius auratus gibelio*	Amur basin
M. pseudoparvus Li & Nie, 1973	skin	*Carassius auratus gibelio*	China
M. sacchalinensis (*Lentospora sacchalinensis* Fujita, 1923) Landsberg & Lom, 1991	kidney	*Carassius auratus gibelio*	Japan
M. solidus Shulman, 1962	gills	*Carassius auratus gibelio*	China
M. sphaericus (*Lentospora spherica* Fujita, 1924) Landsberg & Lom, 1991	kidney	*Carassius auratus gibelio*	Japan
M. turpisrotundus Zhang., Wang, Li, & Gong, (2010)	skin, fins	*Carassius auratus gibelio*	China

Table 2d. Thelohanellus spp.described from taxa of the genus Carassius
2d. táblázat. A Carassius nembe tartozó taxonokból leírt Thelohanellus fajok

Name of the parasite/Parazitafaj neve	Infected organs/ Fertőzött szerv	Fish species as described/Gazdaállat	Locality/Helyszín
T. carassii Akhmerov, 1960	gills	*Carassius auratus gibelio*	Amur River, Far-East Russia
T. hupehensis Ni et Li, 1992	spleen, kidney	*Carassius auratus auratus*	China
T. liaohoensis Chen in Chen et Ma, 1998	gall bladder	*Carassius auratus auratus*	China
T. membranicaudata Sun, 2006	gills	*Carassius auratus auratus*	China
T. nanhaiensis Chen in Chen et Ma, 1998	gills	*Carassius auratus auratus*	China
T. oliviformis Wu et Wang, 1982	muscle	*Carassius auratus gibelio*	China
T. relortus Chen in Chen et Ma, 1998	gills	*Carassius auratus auratus*	China
T. wangi Zhang, 2013	gills	*Carassius auratus gibelio*	China
T. wuhanensis Xiao et Chen, 1993	skin	*Carassius auratus gibelio*	China

Table 2e. Myxosporeans found in taxa of the genus Carassius in Hungary
2e. táblázat. A Carassius nembe tartozó taxonokból megtalált nyálkaspórások Magyarországon

Name of the parasite/ Parazitafaj neve	Infected organs/ Fertőzött szerv	Fish species as described/Gazdaállat	Described in/ Eredeti leírási helyszín
Myxobolus carassii Klokachewa, 1914	liver, intest., abdominal cav.	*Carassius carassius*	Russia
M. diversus Nie & Li, 1973	fins	*Carassius auratus*	China
Sphaerospora carassii Kudo, 1919	gills	*Carassius gibelio, C. auratus*	Japan
Hoferellus carassii Achmerov, 1960	kidney	*Carassius gibelio*	Amur River
Myxobilatus sp.	kidney	*Carassius auratus, Carassius gibelio*	
Myxidium sp.	kidney	*Carassius auratus, Carassius gibelio*	

Molecular biological studies indicate that DNA sequences of the goldfish and the gibel carp resemble to each other much better than to the crucian carp (Jia et al. 2006; Zhu et al. 2006; Sakai et al. 2009).

It comes from the uncertain origin of the *Carassius* spp. that there is a great confusion both in the Latin and English names. This situation characterize first of all Chinese papers. No matter the two species, *Carassius carassius* and *C. auratus* described by Linnaeus (Linnaeus 1758), have commonly accepted names as crucian carp and goldfish, respectively. Unfortunately in the Chinese literature *C. auratus* is often called as crucian carp, red crucian carp, etc. The problem is more complex at the gibel carp. The common parasite fauna and molecular evidences prove that the goldfish and the gibel carp belong to one species *Carassius auratus* (Linnaeus, 1758) which has two subspecies *Carassius auratus auratus* (Linnaeus, 1758) and *Carassius auratus gibelio* Berg, 1932. The name *Carassius gibelio* (Bloch, 1782) should be regarded as a junior synonym of *C. carassius* (Linnaeus, 1758). At a similar way designation of the species to Prussian carp is wrong, as the species has nothing to do with the Past Prussia (Molnár 2015).

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