

## 5.—TWO FERTILE CYPRINOID HYBRIDS.

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[A hybrid between the common carp (*Cyprinus carpio*) and a species closely related to the goldfish known as the Karausche (*Carassius carassius* or *vulgaris*) is not uncommon in some parts of Germany, and is intermediate between the two in form, squamation, fins, and the pharyngeal teeth. Although generally recognized as a hybrid and known by a name indicating its parentage, a compound of the names of the two parents, Karpf-Karausche (*Karpf*, the true carp, and *Karausche*, the crucian carp), a distinctive generic and specific name (*Carpio kollari*) is given to it by German ichthyologists. No experiments appear to have been made to ascertain the fertility or character of the progeny of these hybrids until lately. The following article, therefore, supplies a want and will be of interest to carp-culturists. There are no records of the occurrence of the so-called *Carpio kollari* in the United States (or indeed of any other cyprinoid hybrids), and attention should be directed to those places where the carp and goldfish commingle.—THEODORE GILL.]

If I am not mistaken there are at present no positive observations that *Carpio kollari* Heck, or any other of the known hybrids between any of our cyprinoids, are fertile. Von Siebold, it is true, long ago found fully developed ovaries in hybrid carps ("Fresh-water Fishes of Middle Europe," Leipzig, 1863), and recently District Magistrate Lambateur reported to Prof. Landois "that the fish spawned in the months of March and April" ("Westfalens Thierleben," Fische, Munster, 1892), yet this eminent zoologist seems to partly doubt the correctness of this observation.

This year, in order to clear the matter up, I have made different experiments with full-grown typical examples of *Carpio kollari*, as well as with *Alburnus leydigii* (*Alburnus lucidus* × *Leucaspius delineatus*) in numerous clay pits of my own make. The pools, perfectly constructed ponds, were protected against ducks, geese, etc., by high barbed-wire fences, had lain dry a long time, and were exclusively stocked with the specimens for experimenting; to these they offered, with a rich food supply, excellent spawning-places.

In the first pit there were put 2 females of *Carpio kollari* Heck and 1 male of *Cyprinus carassius* L.

In the second pit there were put 1 male of *Carpio kollari* Heck and 2 females of *Cyprinus carassius* L.

In the third pit there were put 3 males of *Carpio kollari* Heck and 6 females of *Carpio kollari* Heck.

The spawn was surprisingly sparse and, besides, about 60 per cent of the fry died during the first days of life. (The same occurred this year with the fry of pure carps

and crucians in nearly all the breeding ponds in Schlaupitz.) As a cause of this I would mention the possible effects of an abnormally high temperature after a thorough contamination of the waters by manure during the melting of the snow. The water which filled the pits was supplied from our ponds. The result was, in pit No. 1, 20; in pit No. 2, 15; and in pit No. 3, 25 young cyprinoids; of these, 9 in pit No. 1, 10 in pit No. 2, and 6 in pit No. 3 were genuine crucians; 5 in pit No. 3 were genuine scale carps; the balance were more or less *Carpio kollari* Heck.

A fourth clay pit, also a perfectly constructed pond, was stocked, exactly as stated above, with hybrid carps and scale carps, after it had been divided by high embankments (brick walls) into three approximately equal ponds. Those showed apparently somewhat more offspring than the above-mentioned hybrids, but also in this instance more than one-half was lost, so that I could get out of—

A (2 females of <i>Carpio kollari</i> × 1 male of <i>Cyprinus carpio</i> ).....	30 specimens.
B (1 male of <i>Carpio kollari</i> × 2 females of <i>Cyprinus carpio</i> ).....	50 specimens.
C (1 male of <i>Carpio kollari</i> × 4 females of <i>Carpio kollari</i> ).....	20 specimens.

Of these I consider that in A there were 15 specimens, in B 35, and in C 3 that were typical carps; in C there were 5 genuine crucians; the remainder were half crucians in various gradations, but much nearer—in A and B almost without exception—to the *Cyprinus carpio* than to the *C. carassius*.

The experiment with the *Alburnus leydigii* had to be made in "Lund" hatching troughs, as I had to use the other pits for other experiments.

In No. 1 I placed 1 male of *Leucaspilus delineatus* and 2 females of *Alb. leydigii*. In No. 2 I placed 2 females of *Leucaspilus delineatus* and 1 male of *Alb. leydigii*. I did not have more of these little fish.

*Results:* In No. 1 there were 60 fry, 51 of which were *Leucaspilus delineatus*. In No. 2 there were 40 fry, 34 of which were *Leucaspilus delineatus*.

The circumstance is very remarkable that almost all these stock fish, while in all other respects true "Moderrapfen" (*Leucaspilus*), inherited the perfect lateral line of *Alb. leydigii*, and in the few others this line reaches quite far back.

I would call the attention of the reader to the fact that years ago I often obtained in the Upper Zobten waters *Leucaspilus delineatus* with a perfect lateral line.

Of *Alburnus lucidus* × *Leuciscus erythrophthalmus* as well as *Leucaspilus delineatus* × *Leuciscus rutilus* (*Leuciscus carii*) I had only one specimen each; the experiments made with them did not give any results, though I hope in future to also obtain offspring from them. It is true many objections can be made against this latter assumption, as Claus says:

The hybrids only form intermediate stages with disordered generative organs without prospect for offspring, and even in case of fertility, which was often observed in female hybrids, they revert back to the paternal or maternal species.

SCHLAUPITZ, August 24, 1893.