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Nothobranchius palmquisti (Tropicarium stock)

The present stock of a Notho that is usually called by the species name of "palmquisti" was imported in 1957 by Tropicarium in Munich. A black-white photo (not very instructive) was shown in one of the last 1957 issues of DATZ. 3 friends and I imported 6 pairs from Tropicarium in early 1958. They came in on 13 Jan. 58 and possibly were aquarium bred youngsters - very uniform and no doubt a pure stock. I had one pair which was put into a 15 liter tank with very fine mud bottom and the common "rainforest water" to which in this particular case I added 1000 ppm of common salt (1 gramm/liter of NaCl) because fishes came in a water which contained an equal amount of salt. The breeding pair was not fully grown - 20-25 mm in total length.

The real palmquisti was described by Loennberg in "Yngve Sjoestedts Zoologische Kilimandjaro-Meru Expedition 1905-1906. about 5 Vol I" as *Fundulus palmquisti*. Loennberg had 28 mostly small specimens at hand. These were caught in an inundated cocoa plantation at Tanga on 5 June 1905. He described the colors of the male like this: "Every scale of the male has near its posterior margin a carmine red band and these bands are connected with each other so as to form continuous transversal somewhat wavy red bands across the body in similar numbers as the transverse series of scales... Caudal fin bright red, anal and dorsal fins with carmine red spots in the shape of short streaks on the rays a little weaker on the web but connected into irregular bands across the fins. Female uniformly colored, probably greenish in life without markings. Largest male measured from tip of snout to end of caudal fin 42 mm. Nearly related to *F. guentheri* Pfeffer...2" Our present stock might be identical with Loennberg's species.

From an aquarists point of view this species or race is closely related to our present stock of "guentheri" compared to the other species that we presently keep in our tanks. "palmquisti" is smaller than "guentheri". Males rarely grow bigger than 50 mm total length and females in particular are much smaller than females in "guentheri". Most of the about 25-30 females I raised did not exceed 40 mm at an age of about 6 months. This summer I had one female "palmquisti" and one female "guentheri", same age, growing in the same small tank together with some male "palmquisti". The female guentheri grew faster and now, after about 4 months, she is at least 50% bigger than female palmquisti. She is also bigger than the male palmquisti of same age that have been together with her since hatching.

The male "palmquisti" no doubt is the most handsome of the Nothos presently kept in tanks, and possibly

one of the most handsome aquarium fish ever kept in tanks. The ground color of the male is brilliant blue in the head and the sides of the body, against the back this color diffuses into a greenish olive, whereas against the belly and throat the blue color diffuses into a clear yellow color (lemon). The eye is big and has a glaring blue cast. Every scale on the body sides is finely edged by a clear red line. These lines form a very regular net pattern on the body sides, just as in the "melanospilus" of Hansen's stock. Dorsal and anal fins are very big (compared with "melanospilus" of Hansen) and have a beautiful clean lemon ground color, dotted with red. The caudal fin might be brilliant uniformly red and no dark edge is seen on the hindmost part of that fin (my friend Claus Petersen lost his pair in 1958 and cross bred some of my males with some of his females "guentheri" and had some fry which were just like my males "palmquisti" but the caudal fins in these possible hybrids had a sharp blackish edge, just as in the "pure guentheri". Dr. Ladiges informed me that males in the German stocks of "palmquisti" might have a dark edge of the caudal fin. Dr. Ladiges also found that these stocks showed an abnormal dispersal in the zoological measurements. This points in the direction of a conscious or unconscious crossing between the pure stocks of "palmquisti" and "guentheri". Also as "palmquisti" produces up to 90% of males in the broods and "guentheri" tends to produce a great surplus of females there might be a temptation to cross breed these two forms. As mentioned in a previous note, crossing of "palmquisti" males to "guentheri" females is very easy. Therefore it might be of importance that some of us try to keep the pure stocks of both forms.

The females of both "palmquisti" and "guentheri" have no dark spots on the body sides, nor on the fins. Therefore they are easily distinguished from the females in "melanospilus" (Hansen's), the "kuhntae" (Griem's or Roloff's), the "mayeri" and "orthonotus" (Roloff's) because in these forms the females have the dark spots on the body (and fins?). As also "rachovi" (Roloff's stock) now is going to be spread among the egg receivers, we have to face another problem because the female "rachovi" is very very close to female "palmquisti". I think I will always be able to take any female "palmquisti" out from a mixed brood of "palmquisti" and "guentheri". It is not easily explained how to do this because it mostly is a question of knowing these two forms very well. The first step might be looking at the colors: "guentheri" is more brownish, "palmquisti" is more olive and more transparent. Her anal fin might be longer than in "guentheri". But most differences you will note with a general look. Possibly I will not be able to distinguish between females "rachovi" and females "palmquisti" just now. Female "rachovi" seems to have some green color in her anal fin when she is seen in a certain light. My stock of "palmquisti" bred true in 1958 and I hope to keep the pure form as in 1959, but as females are so rarely developed in this form I might lose the pure stock. Therefore if you still have the pure stock, please try to keep it.

Tanga is situated at the coast of Tanganyika near the frontier to Kenya. This place falls within the proposed distribution of "guentheri". The keeping of this species in no way differs from the other forms presently kept in tanks. The "weak point" is the period of maturity where at least the males are very sensitive against diseases and lots of them might die within a few days. After maturity the form is much more robust and my big breeding stock in 1958 did not give any severe problems for many months. It seems as if the cleanness of the water plays a certain role, also that problems appear together with the blue green algae, but this does not hold true in all cases. My copper net possibly saved my last remainders of the pure stock this year. Whenever any trace of Oodinium (whitish or yellowish edges on

scales in particular on head and neck) appear, the copper net is placed in the tank . In 1958-59, I kept lots of males together in small tanks (25 or more in 15 liter glass tanks) and rarely they did hurt each other. Breeding took place in the same tanks with 3-4 males and about 10 females in each tank. Even in these tanks the males normally did not hurt each other. Recently I was looking into my big 320 liter tank where lots of *Cynolebias melanotaenia* live (mostly males). A few big male "palmquisti" ("weeds") came out from the broods of "melanotaenia". One of these males was severely fighting a smaller male of "melanotaenia". I was surprised to see how close these two non-related species were in their fighting procedure and how red the caudal fin of the "melanotaenia" appeared compared with the deep red of the "palmquisti". Even as the "melanotaenia" was smaller than the "palmquisti" I did not doubt that he would win that battle. Also if you place some females "ladigesi" in a tank together with some female "palmquisti" (small), most aquarists would be in great trouble to distinguish between these two sorts of females.

With the breeding procedure, there seems to be no particular difference between the stocks of Nothos now kept in tanks. Spawning takes place chiefly on the upper layer of the mud, as males press the females sideways and downwards she may disappear into the mud and by this sideward downward pressing of the male small "holes" in the mud are formed. The male uses his big dorsal and anal fins to keep the female firmly at the right position during spawning. Eggs are plentiful, but they are small. Most measure about 1.0 mm and they are not circular. The membrane is provided with short and rather stiff "hairs" standing right out from the surface at least when eggs are kept in water. They are exactly the same as eggs from "guentheri" and "rachovi", although there may be some little differences in the concentration of hairs on membrane, but possibly not enough to make it possible to distinguish between eggs from these 3 forms. Eggs do not adhere to peat, normally.

My females produced about 100 eggs each week (30 mm females) but no doubt they are able to spawn any more eggs in a week.

Egg Data:

Old pair: 13 Jan.-04 Feb. 58 washed out 172 eggs. All were placed in a cup on shallow water in order to find out the way of development.

- 19 Feb. 58 (after 15 days): many eggs have embryo with pigmented eye.
- 27 Feb. 58: first fry hatched (water had 1000 ppm of NaCl) (at least) without my help, it is a belly slider.
- 13-15 Mar. 58: take out 70 eggs and try hatching using dry food in the normal way. All did hatch. Only 7 were not belly sliders and gave me 7 fine males.
- 01 Apr. 58: dry food on 8 ripe eggs gave 3 sound fry from which the first female appeared. She was raised together with one of her brothers in a 15 liter glass tank, plenty of room and plenty of food. She was growing at the same speed as the male and 13 May 58 I washed out more than 100 eggs from their tank, but most got fungus (normally one gets very few infertile eggs from this species, but this male was very young indeed).

Old pair: 04-25 Feb. 58 very many eggs seen. These concentrated with little coarse peat and kept on

shallow water until 14 Mar. 58, then dried quickly and very hard. Samples were mailed to Scheidnass (45 fry), Emmens (1 fry) and Agar (0 fry). Professor Emmens saw many "eyed eggs" in the peat which possibly was frozen in airplane. After packing these 3 batches a small sample of fine dry peat was left. I saw a few eggs. I put that sample (1/2 a pipe full) into rainwater and next day I had 119 fry (05 May 58).

- On 20 May 58 (after 16 days) the first male showed his red tail.
- On 27 May 58 (after 23 days) I noticed the first spawning. As none of the other 5 pairs imported did give any results I had to distribute this brood in 5 different tanks (15-25 liters) in order to establish a stock. Indeed this was a good idea because, soon after the sorting, 30 fine specimens in one of the tanks died within 24 hours without any warning, no young "palmquisti" in this tank did survive. Also in some of the other tanks young "palmquisti" began to die, but not all were killed. Fry are rather small and not very pigmented. They measured about 4.0 mm just after hatching, but after 14 days they normally measured 15 mm.

Old pair: 25 Feb.-14 Mar. 58: very many eggs. After washing out of fine particles the sample was dried at once.

- 04 Apr. 58: first watering, no fry, all eggs inspected were transparent and had no trace of an embryo. Under the microscope I saw fine strings in eggs (resting embryo?). Dried at once.
- Second watering 20 Apr. 58: no fry, eggs are not apparently changed. Dry again on 22 Apr. 58.
- Third watering on 17 May 58. 25 fry, the residue dried and mailed (Emmens and Guevara).

Old pair: 14-19 Mar. 58 76 eggs washed out of mud. Mixed up in moist peat and dried very hard at once.

- 03 May 58: several eggs were "shaked" out from the dry peat (very dry peat). All are transparent, no trace of a developing embryo.
- 08 May 58: first watering, no fry. Peat stayed in water until 18 May 58, then some eggs were washed out for inspection. Now the embryo is growing and blood systems have developed. Dried up and mailed (Agar) on 19 June 58.

As far as I am able to find out from the many spawnings in 1958 of "palmquisti", the development of the eggs might be belated (as resting eggs or more possibly as resting embryo) if you dry up peat at once after removing the bottom mud of the breeding tank. This "rule" might be true for all Nothos. The more you dry up the peat, the more belated eggs you will get. If eggs are kept on shallow water with free entrance to air, most of them will develop within the next 3-4 weeks.

In the breeding of annual fish it may be of great importance to know how long a certain sample of eggs in dry peat can be stored at room temperature without killing all fry in eggs. Certainly this question is not easily answered because much depends on how many eggs in the peat will stay in the state of resting egg/resting embryo and how many eggs will develop to a resting fry, and, last but not least, how long will a resting fry be able to survive in this state without being hatched.

Here is some data from peat samples that were kept during the winter 1958/59 hoping to provide a fresh

stock of "palmquisti" in the early spring of 1959. All these samples were strongly concentrated and had hundreds of hundreds if not thousands of eggs.

- 1) spawning 19 females 12 July-02 Aug. 58: eggs on shallow water until 23 Aug. 58 and then dried up in little peat. 28 Feb. 59: first watering gave 5 sound fry, 5 belly sliders plus 33 eggs with fully developed fry, rather turbid to look at, but alive, 2 transparent eggs resting eggs. A few fry hatched from the 33 ripe eggs, all other fry soon died inside the eggs. 2 transparent and good eggs developed on shallow water.
- 2) spawning until 04 Oct. 58: sample dried on 10 Oct. First watering on 20 Apr. 59 very many "gray" eggs (with ripe fry, dead) were seen on the bottom of the jar and at the surface of the water. Only 25 fry were alive on 22 Apr. 59. They are very weak. Among the many dead eggs I found 11 transparent resting eggs that developed later on in water.
- 3) Klementsens "exchanged female" spawning one of my females until 11 Oct. 58. 11 eggs. Low water until 22 Nov. 58, then all were more or less ripe. Dried 22 Nov. 58. 28 Feb. 59: hatched 5 sound fry plus one belly slider plus one sound fry after another 36 hours, no eggs in peat. All these (4 survived) fry turned out to be males (see "sex ratio").
- 4) last spawning until 20 Nov. 58, dried at once. Half of this sample was watered on 07 May 59 and gave 18 more or less sound fry, 1 ripe egg, 1 egg with half developed embryo and 1 resting egg. Other half was watered on 22 June 59 giving 14 fry, some of these are very weak. Only one egg was found in peat: a fine resting egg. No eggs with dead fry seen in this sample.

All samples were stored at 23-26 C in my fishroom.

These results are not very encouraging when compared with *Cynolebias* and *Cynopoecilus*, excluding *Pterolebias peruensis*. No doubt we have to find out a method to enable the development of the eggs, and we should try a closed and water-filled ampoule or keeping the eggs under fine mud in water.