

ON A NEW GENUS AND A NEW SPECIES OF A
SUBTERRANEAN PRAWN *TROGLINDICUS PHREATICUS*
(CARIDEA, PALAEMONIDAE)

K. N. SANKOLLI & SHAKUNTALA SHENOY *

Taraporevala Marine Biological Research Station,
Konkan Agricultural University, Bombay 400 002

ABSTRACT

The present paper deals with discovery of an interesting subterranean freshwater prawn genus *Troglindicus* collected from an ancient well (13th Century?) near Ratnagiri port along the west coast of India in close proximity of sea shore. The only other genus *Troglocubanus* to which the present new genus closely resembles is described from such a distant place like Cuba. The new genus is represented by a single species *Troglindicus phreaticus* n.sp. collected so far from only two adjacent freshwater wells in Ratnagiri fort area. This new prawn besides having its own distinctive features has one unique character that is presence of a transverse suture distally on carpus of second cheliped, a feature so far not reported in any of the Decapod Crustaceans, as far as the authors are aware.

INTRODUCTION

During the course of marine faunistic studies in Ratnagiri over 15 years, the authors were attracted by an old (13th century?) freshwater well in close proximity of the sea on the northeastern edge of the Ratnagiri fort area (photograph-I). To find out whether this well which is so near the sea, is anchialine and if so what is the fauna etc studies were conducted on this and nearby wells in the fort area.

The fort area is surrounded by the Arabian Sea on all sides except on the eastern side where it is connected to the mainland. There

are several wells in the area but the above well (on the northeastern side; photographs-II to IV) though very close to the sea is surprisingly not anchialine but has highly potable pure freshwater. The depth of the well is 3.5 m and the water level is generally (less than ½m) except during monsoon (June to September) when this entire well gets flooded with water from surrounding area alongwith debris etc. The fauna of this well consists of mainly some insect larvae, ostracods and a small orange-red palaemonid prawn. This subterranean/troglobitic red prawn, on subsequent studies, was found to be new to science belonging to a genus hitherto undescribed.

* For both authors, present address:

Marine Biological Research Station,

College of Fisheries, Peth Killa, Ratnagiri-415612. INDIA.

P.S.

TROGLINDICUS n. gen.

Definition :

Rostrum well developed but without ventral teeth. Carapace with only antennal spine, no hepatic or branchiostegal spines but branchiostegal groove distinct. Eyes with small anterolateral rather superficial pigment spot (Fig. 1, a₂). Antennule with two rami of upper flagellum fused basally, inner ramus rather short. Antenna with normal scale; peduncle with ventrolateral spine; flagellum shorter than in *Troglocubanus*. Mandible with molar and incisor processes well developed, palp absent. Other mouth parts typical of palaemonids. First pair of pereopods slender, fingers at most as long as palm, second pair of pereopods stronger, heavier, equal, subequal, or slightly unequal; carpus short, stout with distinct transverse suture distally (Fig. 1, k); fingers slightly shorter or as long as but no longer than palm and cutting edges armed with prominent basal teeth at least in larger specimens. Third to fifth pereopods typical, quite stout with simple dactylus and transverse row of setae distally on propodus. Abdomen smooth, all pleura rounded. First pair of pleopods in both sexes with small endopod without *appendix interna*; remaining pairs with *appendix interna* (2nd pleopod of male with *appendix masculina* also). Telson somewhat broad and arcuate posteriorly (broader than in *Troglocubanus*); two pairs of dorsal spines; two pairs of posterior spines — outer short + inner long and stout, with long plumose setae in between. Uropods normal, overreaching telson, with accessory spinule on inner side of subapical spine of exopod.

TYPE-SPECIES: *Troglindicus phreaticus* n. sp. So far this genus is represented by a single species *Troglindicus phreaticus* n. sp. recorded from the type locality only.

Remarks :

The new genus very closely resembles the Cuban genus *Troglocubanus* of blind cave-dwelling species, but can be easily separated

from it as follows:

1. More robust appearance of the new genus.
2. Eye with a small pigment spot in new genus, without any traces of it in *Troglocubanus*.
3. Telson broad posteriorly, unlike the long, slender and posteriorly narrowing one in *Troglocubanus*.
4. Carpus of second cheliped with a distinct transverse suture distally, not found in *Troglocubanus*.
5. Wide geographic separation from the localities of *Troglocubanus*.

The new genus is named *Troglindicus* to indicate its occurrence from India and its close resemblance to another subterranean genus *Troglocubanus*.

To accommodate this new genus in Holthuis' (1955) key for Caridean genera of the subfamily Palaemoninae, point 8 of his key needs to be amended as follows:

8. Mandible without palp. Eyes without pigment or with a small pigment spot a
 - a) Eyes without pigment.
Carpus of 2nd cheliped without transverse stuture *Troglocubanus*.
 -) Eyes with a small pigment spot. Carpus of 2nd cheliped with a distinct transverse suture distally *Troglindicus* n. gen.
 - Mandible with a palp. Eyes distinctly pigmented 9

a — Entire ani
a₂ — Eyestalk
e — First Ma
i — Third Ma

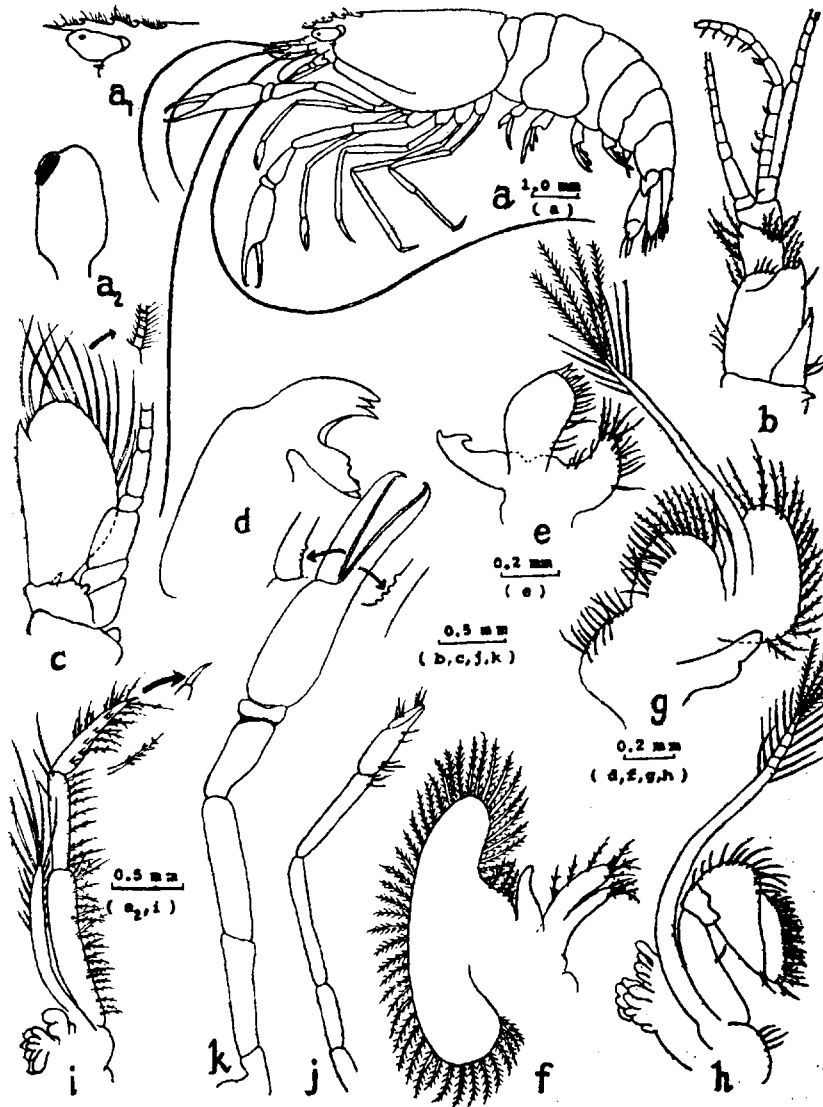


Figure 1. *Troglindicus phreaticus* n. gen. & n. sp.

- a — Entire animal (lateral view); a₁ — Anterior part of carapace showing rostrum, eyestalk etc;
- a₂ — Eyestalk highly magnified dorsal view; b — Antennule; c — Antenna; d — Mandible;
- e — First Maxilla; f — Second Maxilla; g — First Maxilliped; h — Second Maxilliped;
- i — Third Maxilliped; j — First Pereiopod and k — Second Pereiopod.

e of the new genus.

ment spot in new
ces of it in *Trogl-*

ly, unlike the long,
narrowing one in

iped with a distinct
ally, not found in

ation from the loca-
s.

Troglindicus to in-
India and its close
subterranean genus

w genus in Holthuis'
era of the subfamily
his key needs to be

Eyes without
l pigment spot
..... a

ent.
iped

..... *Trogllocubanus*.

igment

inct
istally

Troglindicus n. gen.

Eyes

..... 9

TROGLINDICUS PHREATICUS n. sp.
(Figs. 1 & 2)

A small orange-red coloured troglobitic prawn from two freshwater wells.

Description :

ROSTRUM (Fig. 1, a) slender, almost straight, reaching variously from slightly beyond 1st segment to middle of 2nd segment of antennular peduncle; rostral formula $\frac{4-5}{0}$, 2 postorbitals (in very few only one), dorsal margin with fringe of hairs in between teeth while ventral margin smooth without any teeth or hairs.

CARAPACE (Fig. 1, a) smooth except for a well developed antennal spine placed submarginally and little below rounded lower orbital angle; pterygostomial angle rounded; branchiostegal groove present and fairly distinct.

EYESTALKS (Fig. 1, a₁ & a₂) quite stout, narrowing anteriorly to somewhat conical shape, reaching to middle of rostrum, a small black superficial pigment spot placed distolaterally.

ANTENNULE (Fig. 1, b): Basal segment of peduncle large, laterally expanded on outer margin, ending in a strong spine almost overreaching middle of 2nd segment; 2nd and 3rd segments subequal, 2nd with a fringe of setae on inner margin. Stylocerite pressed close to basal segment, slender and acute, reaching to about middle of basal segment.

ANTENNA (Fig. 1, c): Scale broadly ovate, narrowing basally and about twice as long as broad, distal margin rounded extending beyond outer terminal tooth. Also, scales of either side asymmetrical in some, right or left being larger, extension of scale also varying from short of, upto and a little beyond antennular peduncle, irrespective of size or sex. Peduncle about half in length of scale, 2nd segment (basicerite) with a strong acute ventrolateral spine (not seen in dorsal view) at base of scale and a small knob-

like projection on inner side.

Mouth parts typical.

MANDIBLE (Fig. 1, d): Without palp. Both processes well developed, incisor with 3 sharp teeth and molar with 5-6 blunt teeth.

FIRST MAXILLA (Fig. 1, e): Endites normal, palp with distinct bifid tip.

SECOND MAXILLA (Fig. 1, f): A single deeply cleft elongated endite, palp simple, scaphognathite large.

FIRST MAXILLIPED (Fig. 1, g): Protopod bilobed, lobes separated by a median notch. Narrow elongated epipod, distinctly incised.

SECOND MAXILLIPED (Fig. 1, h): With flagellar exopod and epipod having podobranch.

THIRD MAXILLIPED (Fig. 1, i): Extending from a little shorter to beyond antennal scale. Exopod slightly overreaching basal segment of endopod. Second segment of endopod more than half basal segment, last segment subequal to 2nd, terminating in a claw-like tip as in figure, armed on its inner margin with bristles having hook-like serrations. A small scale-like epipod and an arthrobranch present.

PEREIOPODS :

1ST PAIR (Fig. 1, j): Chelate, slender, fingers shorter than palm, chela provided with groups of setae on surface but cutting edges smooth. At base of propodus and distal part of carpus on inner margin a thick row of serrated bristles. All segments smooth.

2ND PAIR (Fig. 1, k): Chelate, comparatively robust, large, equal, subequal or slightly unequal (left or right larger), extending beyond antennal scale by half or more of carpus. No sexual dimorphism. Fingers as in 1st pair, shorter or at most equal to palm but not longer, cutting edges armed with a row of 4-6 small to large tubercle-

m to n — Th
[numerical suffi
specimens show
shown].

it palp. Both pro-
with 3 sharp teeth

Endites normal,

A single deeply
ple, scaphogna-

g): Protopod
median notch.
tly incised.

With flagellar
anch.

xtending from
scale. Exopod
it of endopod.
han half basal
o 2nd, termi-
re, armed on
ing hook-like
ipod and an

nder, fingers
with groups
smooth. At
of carpus on
ted bristles.

mparatively
tly unequal
id antennal
sexual dia-
orter or at
tting edges
e tuberele-

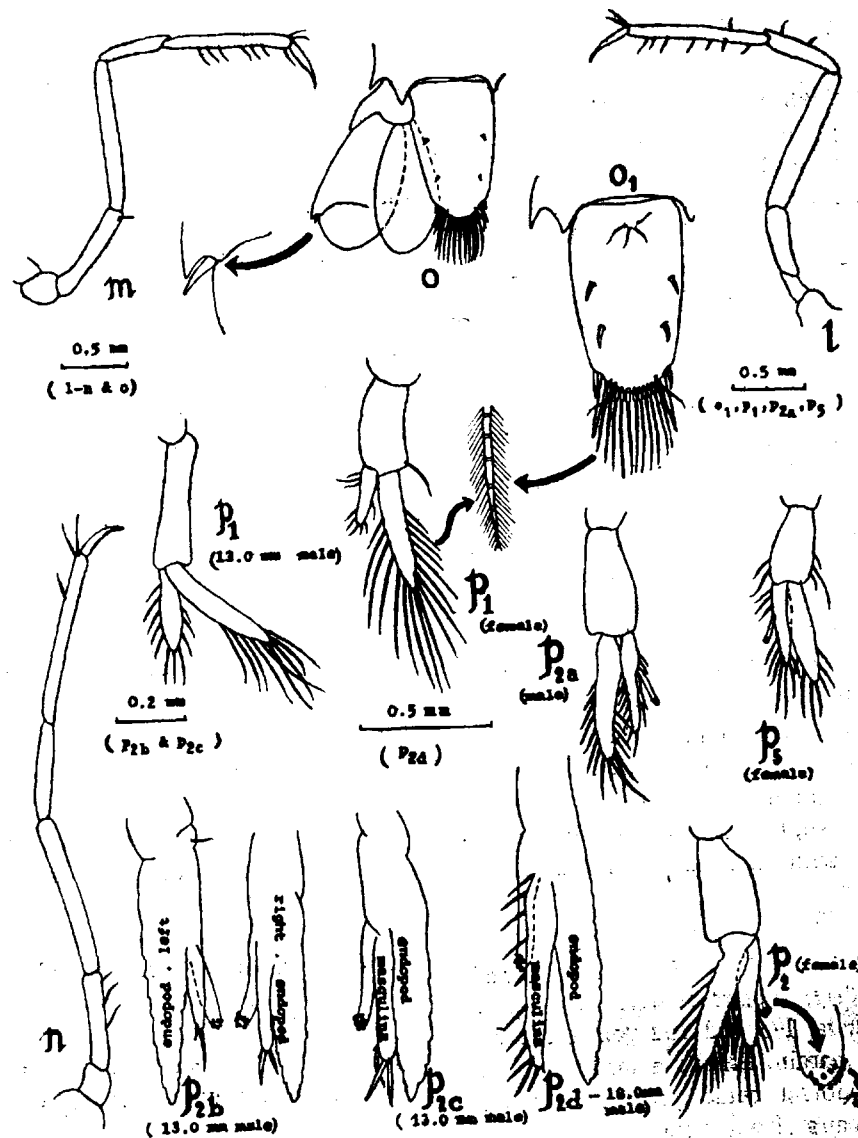


Figure 2. *Troglindicus phreaticus* n. gen. & n. sp.

m to n — Third to Fifth Pereiopods; o — Telson + Uropods; o₁ — Telson; p — Pleopods [numerical suffix indicating pleopod number and alphabetical suffix indicating different male specimens showing variability of *app. masculina* (only endopod with *masculina* and *interna* shown)].

like teeth basally on both fingers in larger specimens of both sexes. Carpus shorter than palm and with a characteristic, distinct transverse suture distally. Merus subequal to palm while ischium more than $\frac{1}{3}$ of merus.

3RD TO 5TH PAIRS (Fig. 2, m to n): Structurally similar, slender, all segments smooth; dactylus simple, more than $\frac{1}{3}$ of propodus; 5th pair with brush of setae on propodus.

ABDOMEN (Fig. 1, a): Smooth, pleura of 2nd segment broadest and of 6th with a small posterolateral point; 6th segment nearly 1.5 times 5th in length.

Five pairs of pleopods — 1st pair in both sexes with endopod reduced, about $\frac{1}{2}$ as long as exopod and without *appendix interna*. In females, remaining pleopods (Fig. 2, p_2) similar, with *appendix interna*, 5th smallest (Fig. 2, p_5). In males, 2nd pleopod with *appendix masculina* (Fig. 2, p_2) which is highly variable (Fig. 2, p_{2a} — p_{2d}) both in length and armature, from shorter than *interna* with few terminal bristles to longer than *interna*, almost as long as endopod, with row of bristles along inner margin, sometimes even those of right and left sides of the same specimen being slightly asymmetrical; remaining pleopods with *appendix interna* as in females.

TELSON (Fig. 2, o and o_1): Elongatedly broad, arcuate posteriorly; 2 pairs of dorsal spines, 1st pair at about distal $\frac{1}{3}$ and 2nd pair about $\frac{2}{3}$ from posterior margin. Basally a median cluster of 4-5 small dorsal setae present. Posterior margin with 2 pairs of outer spines, inner of the two much longer than outer and 11 plumose setae present between inner spines, besides 2 submarginal stiff setae.

UROPODS (Fig. 2, o): Ovate in shape, overreaching telson. Exopod with a distinct transverse suture and a fairly long subapical spine in addition to terminal spine.

MATERIAL EXAMINED: As many as 100 specimens were collected of which 30 females (berried) and 10 males were examined in detail all specimens being mature adults. Males range from 9 mm to 19 mm and females from 9 mm to 22 mm (berried females from 18 to 24 mm).

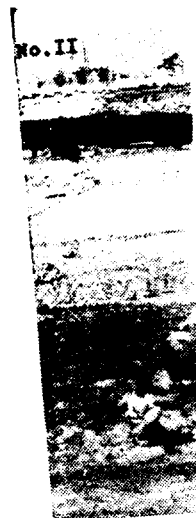
18 males from 9 to 19 mm were specially examined for pleopod studies with reference to variability of *appendix masculina* etc.

ECOLOGY: This troglobitic species was found in the old well described in the introductory part (photographs I-IV) and subsequently in the nearest freshwater well (photograph V) where again the water level is hardly $\frac{1}{2}$ m except in monsoon when the level goes up very much. This prawn is not available anywhere else in Ratnagiri except these 2 wells or in any nearby places. The general topography of the Fort area where these wells are situated is mainly composed of laterite strata. Bottom of the well is covered by laterite stone pieces and small pebbles, red clay and is covered thickly by humus and debris like coconut husk, leaves from nearby trees and vegetation, coir ropes etc. This prawn rarely swims and appears to be a crevice-dwelling form, the porosity and honeycombed crevices of the laterite stones providing ideal shelter. Also this prawn seems to prefer darker or shaded zones of the well. Very few berried females could be collected only during May and June (depending upon the onset of monsoon). Eggs are orange-red, fairly large (about 1.6 mm in longer diameter), elliptical and few in number (exact number cannot be given since only 6-8 eggs were remaining after bringing the ovigerous specimens to the laboratory).

Development appears to be of abbreviated type since a single larva obtained was in very advanced stage almost resembling the adult. Detailed studies on the lifehistory of the species are being continued.

Collections were made by using a hand net of mosquito-net-cloth and yielded more material when operated over darker parts of the well.

Showing Fort w.
general topograp
and Well-1. ●



Closer view
showing veg

As many as 100 specimens which 30 females were examined in detail (see adults. Males range from 9 mm to 24 mm).

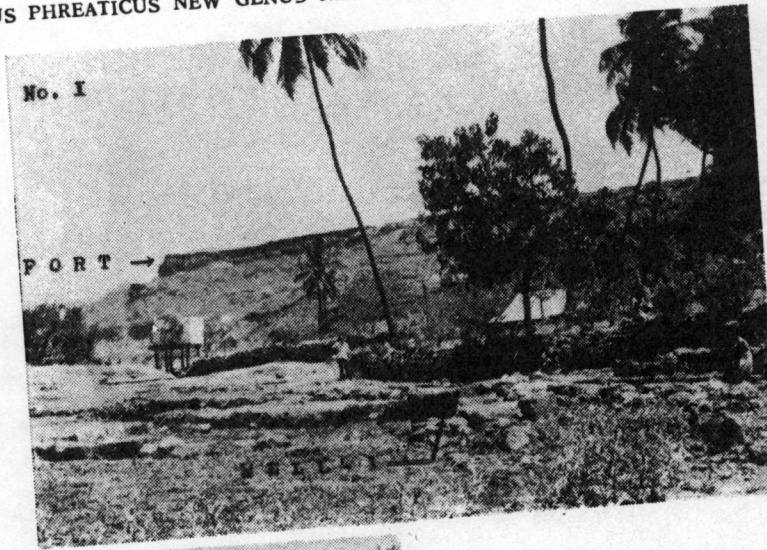
Some were specially examined with reference to *sculina* etc.

This species was found in the introductory subsequently in the photograph V) where it is found only in the soil except in the soil which is very much different from anywhere else in the area or in any nearby area. It is mainly common of the well is in the soil and small pebbles thickly by humus, manure, leaves from the soil, ropes etc. This is to be a crevice-dwelling and honeycombed providing ideal habitat to prefer darker soil. Very few specimens were collected only during the onset of the rainy season, fairly large specimens, elliptical and cannot be given specimens after bringing to the laboratory).

The abbreviated name was in very common use among the adult. The name of the species

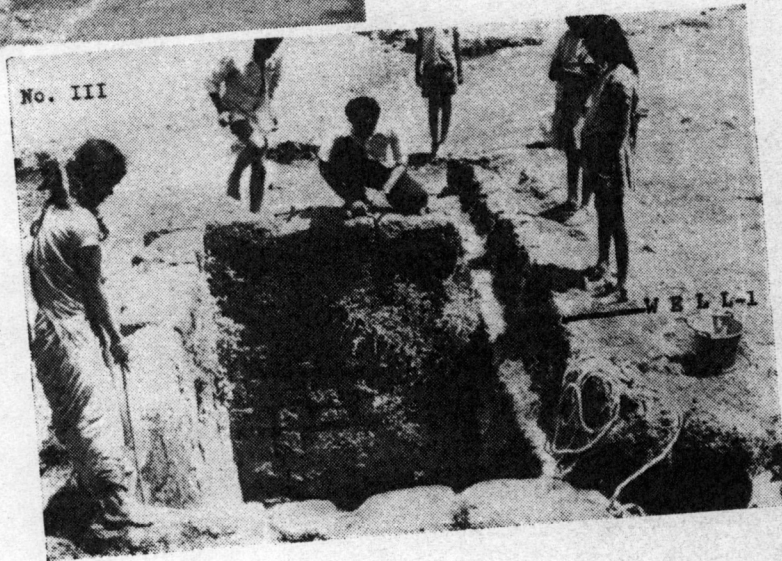
was a hand net used to collect the material from the well.

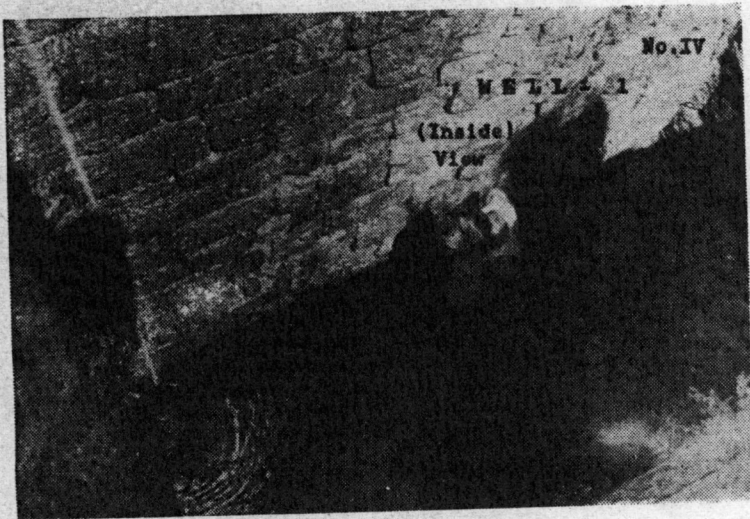
Showing Fort wall, general topography and Well-1. →



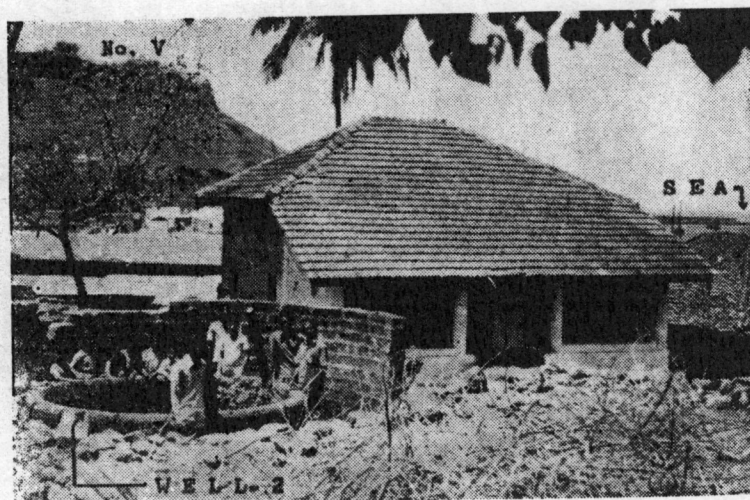
Closer view of Well-1 which is almost at ground level with sea in background. ←

Closer view of well-1 showing vegetation etc. →





Inner view of Well-1 showing laterite wall, bottom covered with pebbles, stone pieces etc.



Showing Well-2 with sea in background.

It was found in captivity for observations on special techniques for purpose and the be dealt with in

COLOUR IN orange-red with the colouration body colour of t

TYPE LOCALITY well (13th centu giri, west coast c

TYPE MATERIAL being deposited : Zoological Survey

male and one fen U.S. National Mu Washington D. C

CHACE, F. A. JR. a summary c *Smithsonian*

FIGUEROA, A. V. nidae), de s: *Cienc. Del. l*

HOLTHUIS, L. B., (Crustacea, I *papers*, 12:

Crustacea; C *Zoologische Leiden*, 26:

It was found difficult to keep this prawn alive in captivity for more than a few days for live observations on behaviour, feeding etc. Hence special technique had to be developed for this purpose and these observations in captivity will be dealt with in a separate communication.

COLOUR IN LIVE CONDITION: Uniformly orange-red with slightly lighter pereopods. Even the colouration of eggs is matching with the body colour of the prawn.

TYPE LOCALITY: Northernmost old freshwater well (13th century?) in the fort area of Ratnagiri, west coast of India.

TYPE MATERIAL: i) Holotype and paratypes are being deposited at the Indian National Museum, Zoological Survey of India, Calcutta.

ii) Other paratypes: One male and one female have been deposited in the U.S. National Museum, Smithsonian Institution, Washington D. C. under Reg. No. USNM 155288.

Also a male and a female paratypes have been deposited in Rijksmuseum Van Natuurlijke Historie, Leiden, Netherlands.

REMARKS: The new species is named as '*phreaticus*' based on the Greek word "*phrear*, — *atos*" meaning well or cistern, designating the source of the present material from a well.

ACKNOWLEDGEMENTS

The authors are extremely grateful to the eminent Carcinologists Prof. Dr. L. B. Holthuis of Leiden Museum, Netherlands, and Dr. Fenner Chace, Jr. of the U. S. National Museum, Washington, for the incessant kind help and guidance and for providing the important references on troglobitic decapod crustaceans. Sincere thanks are also due to Dr. M. R. Ranade, Marine Biological Research Station, Ratnagiri, for facilities at his Station and to his field staff for their willing co-operation in collection work. Special gratitude is offered to Dr. P. C. Raje for his constant, enthusiastic and ungrudging help throughout in observations, collections, etc.

LITERATURE CONSULTED

- CHACE, F. A. JR., 1972. The shrimps of the Smithsonian — Bredin Caribbean Expeditions with a summary of the West Indian shallow water species (Crustacea: Decapoda: Natantia). *Smithsonian Contributions to Zoology*, 98: 17 & 24-25.
- FIGUEROA, A. V., 1971. Una nueva especie de *Troglocubanus* (Crustacea, Decapoda, Palaemonidae), de san Luis Potosi, Mexico. *An. Inst. Biol. Univ. Nat. Auton. Mexico*, 42, ser. *Cienc. Del. Mar. 4 Limnol* (1): 1-6.
- HOLTHUIS, L. B., 1952. Subfamily Palaemoninae. Part II in a General Revision of the Palaemonidae (Crustacea, Decapoda, Natantia) of the Americas. *Allan Hancock Foundation Occasional papers*, 12: 143-153.
- , 1955. The recent Genera of the Caridean and Stenopodidean shrimps (Class Crustacea; Order Decapoda: Supersection Natantia) with keys for their Determination. *Zoologische Verhandelingen Vitgegeven door het Rijksmuseum van Natuurlijke Historie te Leiden*, 26: 1-157.

