A NEW INTESTINAL FLUKE, *PLAGIORCHIS HARINASUTAI* N.SP.

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INTRODUCTION

Seven cases of *plagiorchis* infection have been reported in humans. *Plagiorchis philippinensis* was first recovered from the small intestine of a native of Ilocos Sur, in the Philippines by Africa and Garcia in 1937. McMullen (1937 a,b) infected himself with *Plagiorchis muris*, by swallowing a large number of metacercariae from *Stagnicola emarginata angulata* snails from Lake Douglas in Michigan. The first eggs were found in the stools on the ninth day after infection. Sandground in 1940 found a single worm of *Plagiorchis javensis* in the small intestine of an Indonesian from Java. Lie and Brass (1950) reported two cases, an Indonesian and a Chinese in Lenteng Agung, Indonesia who were infected with *Plagiorchis javensis*. In 1951 Lie found a single specimen of a species of *Plagiorchis* from man in Indonesia. An adult *Plagiorchis muris*, Tanabe, 1922 was recovered from a native in Hiroshima prefecture, Japan, (Asada *et al.*, 1962). In Thailand *Plagiorchis siamensis* had been reported by Yamashita in 1967 from the small intestine of a rat. We present here four new cases of plagiorchiasis in man from Northeastern Thailand.

MATERIALS AND METHODS

During a clinical trial of praziquantel in opisthorchiasis (Bunnag and Harinasuta, 1980; 1981) at the Hospital for Tropical Diseases, Bangkok, stool specimens were collected for three consecutive days following treatment. The worms in the stools were searched and collected by a dilution sedimentation method and examination under a stereoscopic microscope. Six *Plagiorchis* worms were identified in four patients. They were fixed in 8% formalin, stained with Semichon's acetic carmine, counterstained with fast green and mounted in permount.

RESULTS

All patients were treated with a single dose of 40–50 mg/kg body weight. Six new intestinal flukes, identified as *Plagiorchis* sp. were recovered from stools of four patients. The case reports are sumarized in Table 1.

Description of new species *Plagiorchis* (fig. 1 a,b)

The body is flattened, oval, with mean 1.870 (1.745 to 2.022) mm long and 0.607

Table 1

Summary of case reports.

Patient No.	Sex	Age	Resident of Province*	Date Hospitalization	Spicies and no. of worms recovered from stools
1	F	36	Khon Kaen	Sept. 1980	*O. viverrini* 47 *Plagiorchis* spp. 2
2	M	37	Udorn Thani	Feb. 1983	*O. viverrini* 337 *E. malayanum* 5 *E. vermicularis* 9 *P. molenkampi* 5 *P. bonnei* 1 *Plagiorchis* spp. 1
3	M	32	Ubon Ratchathani	April 1984	*O. viverrini* 305 *E. vermicularis* 1 *Plagiorchis* spp. 2
4	M	28	Udorn Thani	March 1985	*O. viverrini* 360 *H. pumilio* 4 *H. taichui* 3 *T. saginata* 1 *Plagiorchis* spp. 1

* see map Fig. 3.

(0.554 to 0.667) mm wide at the level of the two testes; tegumental spines cover the entire body surface. Oral sucker is subterminal, 0.178 (0.158 to 0.214) mm long and 0.186 (0.182 to 0.214) mm wide. Prepharynx is short, pharynx is well developed, muscular, immediately posterior to oral sucker, 0.090 (0.063 to 0.121) mm long and 0.096 (0.081 to 0.109) mm wide. Intestinal caeca bifurcate immediately posterior to the pharynx and end blindly near the posterior end of the body. Ventral sucker is subglobular, situates in the middle of the anterior part of the body, 0.174 (0.142 to 0.191) mm long and 0.176 (0.135 to 0.200) mm wide. Testes are oval, diagonal, the left testis is 0.146 (0.109 to 0.195) mm long and 0.137 (0.106 to 0.162) mm wide, the right testis is 0.138 (0.106 to 0.159) mm long and 0.123 (0.101 to 0.149) mm wide, situated posteriorly near the midline. The cirrus pouch is elongated, tubular and sickle-shaped, 0.489 (0.439 to 0.619) mm long and 0.058 (0.050 to 0.067) mm wide, and is lying to the left over the ventral sucker. The protruded cirrus (Fig. 2), is coiled or curved, 0.291 (0.146 to 0.540) mm long. The ovary is postero-dextral to ventral sucker, ovoidal, 0.163 (0.147 to 0.172) mm long and 0.149 (0.114 to 0.177) mm wide. The seminal vesicle is large, 0.137 (0.097 to 0.203) mm long and 0.051 (0.047 to 0.059) mm wide. The uterus passing between ovary and anterior testis and between both testes, reaching to posterior extremity. The genital pore just in front of the ventral sucker, slightly shifted to the left. Vitelline follicles

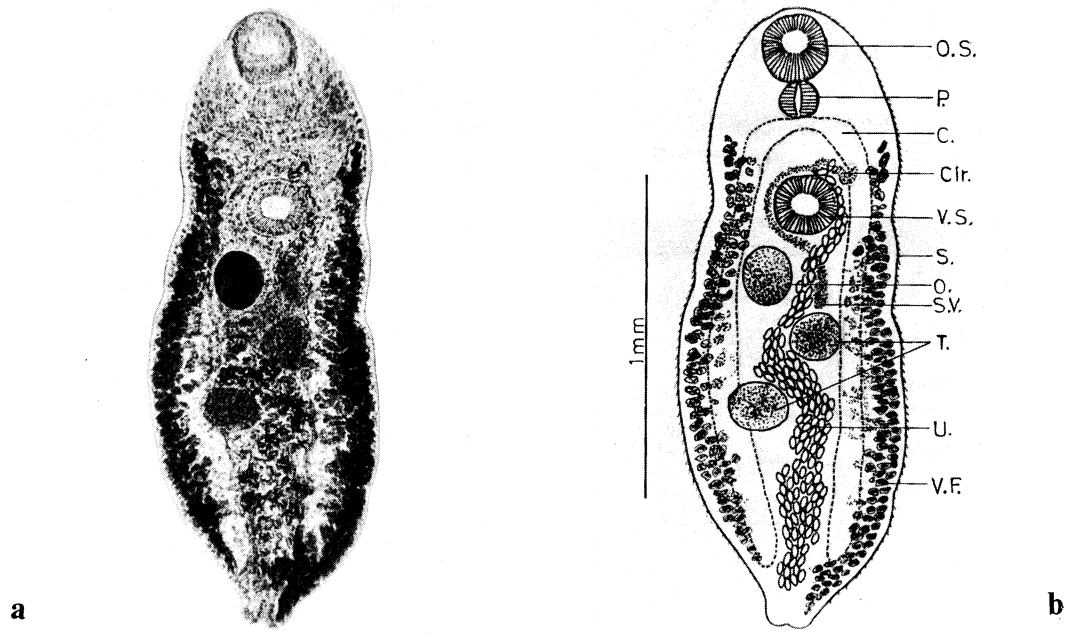

Fig. 1–*P. harinasutai* n.sp. from patient No. 2.
O.S. = oral sucker, P. = pharynx, C. = caeca, Cir. = cirrus, V.S. = ventral sucker. S. = spine, O. = ovary, S.V. = seminal vesicle, T. = testis, U = uterus, V.F. = vitelline follicle,

Fig. 2–Protruded cirrus

extending in lateral fields, posteriorly to the level between ventral sucker and pharynx. Eggs (11 uterine, 1 stained specimen), 33.7 (32.6 to 33.8) microns long and 17.2 (16.9 to 18.0) microns wide, operculated, shell smooth and thin walled.

DISCUSSION

Fifty or more species of the genus *Plagiorchis* have been reported as intestinal parasites of insectivorous animals, such as bats, birds, reptiles, amphibia, fish and mammals, but is rarely reported in man. Schulz and Skworzow (1931) believed that

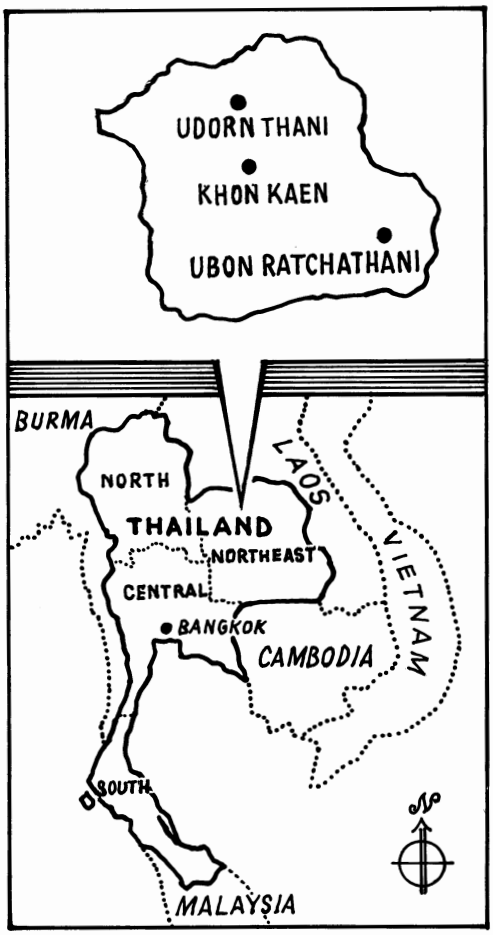

Fig. 3–Map showing provinces in northeastern Thailand, home town of the patients

there are about 24 valid species amongst the fifty or more named species. In most cases, the *Plagiorchis* spp. were found by chance in patients suffering from other fluke infections and the clinical significance of *Plagiorchis* is unknown. The taxonomy of the subfamily Plagiorchiinae is notoriously difficult (Olsen, 1937). The plagiorchid flukes collected from patients in Northeastern Thailand were conclusively described as a new species named as, *Plagiorchis harinasutai*. The specimens differed from the three species of *Plagiorchis* spp. reported from man, (*P. philippinensis*, *P. javensis*, *P. muris*) and from rat (*P. siamensis*) in Thailand. (Table 2).

The following points clearly differentiated these worms from the other species found in man and rats:

1. The size of the oral sucker of *P. philippinensis*, *P.muris* and *P. siamensis* is bigger than the ventral sucker, while the oral and ventral suckers of *P. harinasutai* are of the same size.

2. The ovary of *P. philippinensis*, *P. javensis*, *P. muris and P. siamensis* is smaller than the testes, while in *P. harinasutai* is larger.

3. The ovary of *P. javensis* is located posteriorly to the ventral sucker rim. The cirrus is less lunate in form than that of *P. harinasutai*.

4. The vitelline follicles of *P. javensis* and *P. muris* are united in front of the ventral sucker. In our specimens they do not meet anterior to the ventral sucker.

5. In our specimens the protruded cirrus is very typically coiled or curved, and the length of the protruded organ is about 0.291 mm.

6. The eggs of *P. javensis* and *P. muris* are larger than those of *P. harinasutai* and those of *P. philippinensis* are smaller.

Our specimens are also different from other animal *Plagiorchis* species as cited by Stossich, 1904, Barker, 1915, Schulz and Skworzow, 1931, Macy, 1931, Park, 1936; 1939 a;b, Olsen, 1937 and Fahmy, 1954. As for the intermediate hosts of human plagiorchiasis, the snail, *Lymneae pervia* and *Stagnicola emarginata angulata* are known to be the intermediate host of *Plagiorchis muris* in Japan and the United states of America.

Table 2

Character differentiation among *Plagiorchis philippinensis*, *P. javensis*, *P. muris*, *P. siamensis* and *P. harinasutai* n.sp. (in mm)

Character	*P. philippinensis* (Africa & Gracia)	*P. javensis* (Sandground)	*P. muris* (McMullen)	*P. siamensis* (Yamashita)	*P. harinasutai* n.sp.
Size	1.5 – 2.0 × 0.385 – 0.425	1.82 × 0.68	2.67 × 0.52	1.20 × 0.45	1.870 × 0.607
Oral sucker	0.190 – 0.200	0.25 × 0.22	0.213	0.154 × 0.139	0.178 × 0.186
Ventral sucker	0.155	0.25	0.144	0.090 × 0.077	0.174 × 0.176
Pharynx	0.080 – 0.070	0.12	0.107	0.063 × 0.050	0.090 × 0.096
Ovary	0.110 × 0.085	0.150 × 0.170	0.196	0.088 × 0.072	0.163 × 0.149
Left testis		0.175 × 0.175	0.252	0.154 × 0.175	0.146 × 0.137
Right testis	0.130 × 0.090	0.175 × 0.190	0.231	0.144 × 0.144	0.138 × 0.123
Cirrus sac	0.425 × 0.045	0.22	–	–	0.489 × 0.058
Cirrus	–	–	–		0.291
Seminal vesicle	–	–	–	–	0.137 × 0.051
Eggs	0.028 – 0.030 × 0.019 – 0.021	0.036 × 0.022 – 0.024	0.038 × 0.019	0.033 – 0.042 × 0.019 – 0.020	0.033 – 0.034 × 0.017 – 0.018

Other species have not been studied. The life cycle, pathology, clinical manifestation and public health importance of *P. harinasutai* infection are not known.

SUMMARY

Dilution-sedimentation examination of stool specimens from four opisthorchiasis patients treated with praziquantel led to the discovery of six *Plagiorchis* worms. This is the first known report of *plagiorchis* infection in man in Thailand. The morphological features differed from those of previously described *Plagiorchis* species indicating that these worms belong to a new species, which we designated as *Plagiorchis harinasutai* n.sp. in honour of Professor Chamlong Harinasuta, former Dean of the Faculty of Tropical Medicine, Mahidol University, Bangkok.

The holotype is held at the Museum and Reference Centre. Paratypes are held in the Bangkok School of Tropical Medicine, Faculty of Tropical Medicine, Mahidol University.

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