Conference Paper

Acanthocephalan in *Xenochrophis piscator* Snake in Sidoarjo Indonesia

Inggarsetya Syah Audini[1], Lucia Tri Suwanti[2,4], Setiawan Koesdarto[2], and Emmanuel Djoko Poetranto[3,4]

[1]Student of IPKMV Magister
[2]Department of Veterinary Parasitology
[3]Department of Clinical Veterinary Medicine
[4]Researcher of Institute of Tropical Disease, Faculty of Veterinary Medicine, Airlangga University

Abstract

*Xenochrophis piscator*is a snake that often found in Indonesia, particularly in Java Island.*Xenochrophis piscator*is a non-venomous snake and often used for food, traditional medicine and as pets in Indonesia. Snakes can be infected by different types of parasites which are zoonotic. One of the zoonotic helminth infect snakes is acanthocephalan. Acanthocephalan can be transmitted to humans by ingesting snake products. We investigate the incidence of helminthiasis in *X. piscator* from snakes collector in Tulangan district, Sidoarjo, East Java. Parasites were collected from *X. piscator* organs. Identification of parasites was in carmine stain using light microscope for examination. Sixty snakes were observed and sixteen snakes were positively infected by adult acanthocephalan (26.67%). Acanthocephalan was found in mesenterium and fascia of *X. piscator.*

Keywords: *Xenochrophis piscator*, acanthocephalan, helminthiasis, zoonosis.

Corresponding Author:
Inggarsetya Syah Audini
setyainggar@gmail.com

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1. INTRODUCTION

Xenochrophis piscator also called checkered keelback snake or Asiatic water snake. *Xenochrophis piscator* is non-venomous snakes which commonly seen in freshwater lakes or rivers.[1] *Xenochrophis piscator (X. piscator*) is a snake that found in Indonesia and distribute in Sumatra, Java and Borneo island.[2] Population of *X. piscator* in Indonesia has mostly been regarded as a subspecies named *X. piscator melanzostus* in literature, but there is little doubt about the distinct specifics status.[3] These reptiles are traded by humans as pets. Meat and internal organs used as food such as satay, blood and bile used as traditional medicines and skins used as materials for accessories.[4] The most serious health problems of *X. piscator* is internal parasites caused by its prey. This is because *X. piscator* usually eat earthworms, fish and amphibians which

are potential to carrying parasites.[1] Density of population and diversity of species in one environment can suppress the immune response and increase the chance of parasites infection.[5]

One of the parasites that can infect snakes is acanthocephalan. Most of authors consider the acanthocephala as a minor phylum and equating it with their relatively unimportant. This disproportionate probably because of the relatively small numbers of spesies, their relative lack of pathogenicity to their vertebrate hosts and diversity in acanthocephalan structure and live cycles. The acanthocephalan are undeniably only small phylum with estimate of around more than thousands species. It is also undeniable that they are characterized by great uniformity structure, larval stages and life cycles.[6] *Cystacanths* of *Oligacanthorhynchid acanthocephalan* has been found in Yaqui blackhead snake, *Tantilla yaquia*.[7] Acanthocephalan infection reported in a green tree snake (*Dendrelaphis punctulata*).[8] *Oligacanthorhynchus ricinoides* and *Pachysentis ehrenbergi* also found in body cavity of *Mabuya quinquetaeniata*.[9]

There has been no research about both helminthiasis in *X. piscator* and acanthocephalan in Indonesia. Tulangan district, Sidoarjo, East Java is one of the snakes colector which exporting snake products such as meat and skin from East Java to other country. Therefore we need a study of the morphology of acanthocephalan in *X. piscator* in district Tulangan, Sidoarjo, East Java.

2. MATERIALS AND METHODS

This research was carried out between of December - February 2017. Research samples were *X. piscator* organs from snakes collector in district Tulangan, Sidoarjo, East Java, Indonesia. Parasites worm were collected from *X. piscator* organs. Parasites placed into a petri dish and washed with distilled water to clean. Parasites from snake organ identifyed in Department of Veterinary Parasitology, Faculty of Veterinary Medicine, Airlangga University.

Identification of parasites was in wet or carmine stain preparation using a light microscope with a magnification of 40x and 100x. Acanthocephalan stained in 5% glycerin alcohol at least 24 hour. Specimen transfered into 70% alcohol for 5 minutes then colored with alkohol *Carmine* ±24 hour until redish. Specimen destained into 2% acid alcohol at least 10 minuts then neutralized to alkali alcohol for 20 minutes. After neutralized specimen dehydrated into 70%, 85% and 95% alcohol 5 minutes each time. Specimen mounted into *Hung's* I for 20 minutes then placed specimen into object glass, immersed with *Hung's* II and cover specimen with a coverslip.

Figure 1: White acanthocephalan parasites (black arrows) in A) Mesenterium and B) Fascia of *Xenochrophis piscator.*

3. RESULT AND DISCUSSION

Sixty snakes were examined in the study, sixteen snakes (26.67%) were positively infected by acanthocephalan. Acanthocephalan were collected from mesenterium and fascia (Fig. 1A,B) of *X. piscator*. There were 2 to 4 adult acanthocephalan found in one snake. Acanthocephalan body length between 17-25 mm with everage 22 mm and has cylindrical body shape in white color (Fig. 2A). Acanthocephalan is in medium sized phylum and identified by their proboscis which possesses with several backwardly curving spines to attach themselves to the walls of their hosts (Fig. 2B). This proboscis can be retracted within the body wall by muscular contraction, but then it is extended. Female has reproductive system with relatively long uterus that is slightly constricted at middle (Fig. 2C).Based on its physical examination, parasite was identified as acanthocephalan phylum.

The only hard structures that acanthocephalans have are the hooks on their proboscis but there is considerable specific variation in the arrangement of the hooks. The hooks and shape of acanthocephalans proboscis are different between species and genera but the adaptive reason of the arrangement and specific differences is still not understood. The internal structures are similar but all species have same fundamental life cycle and developmental stages.[6] Host mass influence body size of adult acanthocephalan. Both host body size and host thermal physiology can affect adult acanthocephalan body sizes. Acanthocephalan species which relatively large at one stage of their life cycle are also relatively large at other stages, that means if the adult acanthocephalans body is large, it also has large eggs and cystacanths.[10]

Three species of the genus *Sphaerechinorhynchus* are known to mature only in snakes. *Spaerechinorhynchus serpenticola* has only 2 anterior hooks with simple roots and 4 or 5 posterior rootless spines with body length 17 – 24 mm. In *S. rotundocapitatus*,

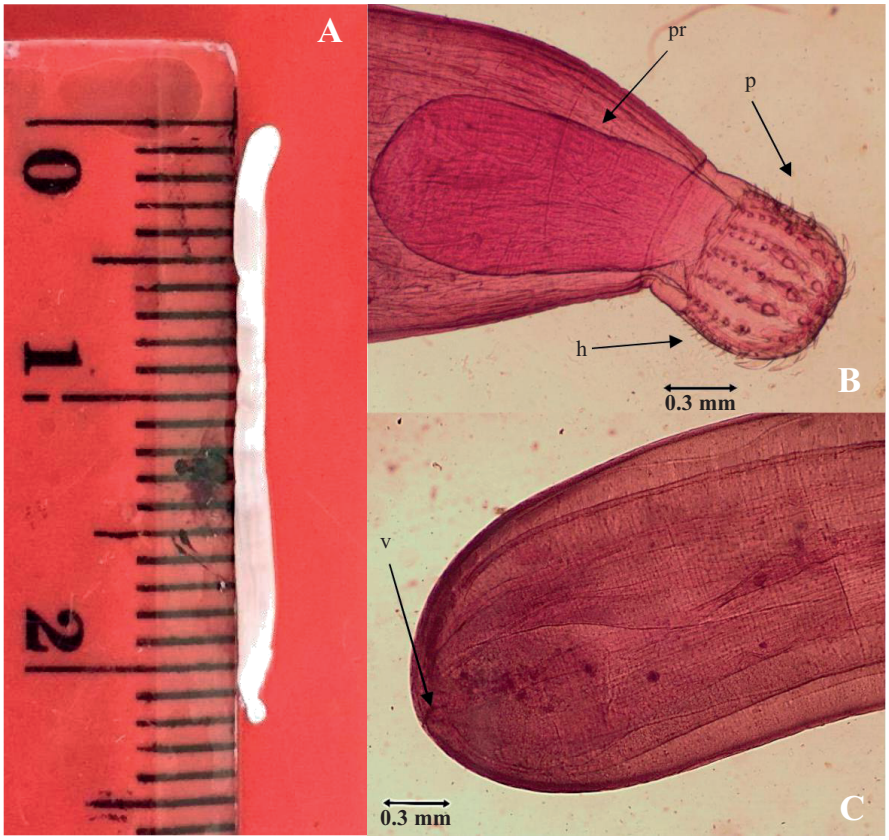

Figure 2: A) Acanthocephalan Length; B) Photomicrographs of acanthocephalan anterior illustrate proboscis (p) with hooks (h) and proboscis receptacle (pr); C) Posterior end of female Acanthocephala with vagina (v).

females have bifid posterior end and only 3 or 4 rootless spines behind the 3 anterior rooted hooks. The third of the 3 anterior hooks of *S. ophiograndis* is smaller than the second, and the number of posterior rootless spines is only 4 or 5. [12] In this study, the acanthocephalan has 2 anterior hooks with simple roots and 5 posterior rootless spines (Fig. 2B). Based on the proboscis, hooks and spines has been describe in previous study the acanthocephalan from the *X. piscator* can determined as *S.serpenticola.*

Acanthocephalans have been identified in water skinks and encysted in muscle, liver, kidney, outer gut wall and spermatic ducts.[11] Acanthocephalan also has been identified as *Sphaerechinorhynchus serpenticola* in *Naja naja* mesenteries and *Ophiophagus hannah* anterior intestine in Malaysia and Thailand, as *S. ophiograndis* in *Ophiophagus Hannah* anterior intestine in Southeast Asia, and as *S. macropisthospinus* in *Hemidactylus frenatus, Kaloula pulchra, Microhyla* sp. intestinal mesenteries and *Ophicephalus striatus* body cavity in Thailand.[12] This study shown that acanthocephalan has been identified in *X. piscator* fascia and mesenterium.

Acanthocephalans in paratenic hosts normally occupy extraintestinal positions in tissues or organs of the body cavity where they become partially encysted. Pathological changes were caused by a normal infection of the snake which the acanthocephalan parasite migrated through the gastrointestinal wall and instead of becoming encapsulated in the body cavity continued migration through the body musculature to the subcutis. Even in preferred or suitable definitive hosts it is not uncommon to find mature adult acanthocephalans in the body cavity of the host.[8]

Most of acanthocephalan species have an aquatic life cycle and it is easier to collect good samples from aquatic populations. That is why most ecological studies focused on aquatic like freshwater because it is far easier to collect large samples of fish and aquatic amphipods than collect arthropods in terrestrial.[6] Eggs are ingested by aquatic arthropods which the infective cystacanths develop. The arthrophods then consumed by intermediate hosts such as small reptiles, amphibians and birds. If ingested by a definitive host, development take place within the gastrointestinal tract, but if ingested by inappropriate hosts the cystacanth migrates into the body cavity and encysts within the tissues. Penetration of the intestinal wall usually without any disruption but it possible to caused coelomitis in amphibians.[8] Eggs are shed in the feces of the definitive hosts which are carnivores and primates, including humans, may serve as accidental hosts. In humans the worms seldom mature or mature but rarely produce eggs.[13]

Acanthocephala can be considered as a high successful group of parasite that can infect all classes vertebrates wich can be found in sea, fresh water, land and birds in the air. Acanthocephalan has ununiformity of live cycle so has little flexibility in development or host use but in reality it can be highly numbers of variability of host used. Some acanthocephalans utilize aquatic snakes and amphibian as paratenic hosts to jump habitats between aquatic invertebrate intermediate host and aquatic predatory birds and more terrestrial raptors. Some acanthocephalans can survive and paratising predators when ingested as adults within their devinitive host.[6] Acanthocephalan *Sphaerechinorhynchus macropisthospinus* has been recovered in paratenic hosts from 3 classes of vertebrates which are fish, amphibian and reptilian that represent a succession from aquatic to terrestrial habitat probably leading to a yet to be identified snake definitive host.[12] The above suggests an aquatic crustacean intermediate host is a common in the life cycle.

4. CONCLUSION

This is the first case report of acanthocephalan infection in *X. piscator* in Indonesia. Sixteen of 60 snakes were positively infected by adult acanthocephalan (26.67%). *Xenochrophis piscator* which infected by acanthocephalan can be transmitted to humans by ingesting its products. Communities need to be careful to consuming snake products.

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References

[1] A. K. J. Gowda, B. K. Rani., C. Nandeesha and Y. Naravi, Ascaridia Galli Infection in a Checkered Keelback (Xenochrophis piscator) Snake (J. Par. Dis. 2016), pp. 1-4.

[2] R. T. Hoser, Divisions Of The Asian Colubrid Snake Genera Xenochrophis, Dendrelaphis And Boiga (Serpentes: Colubridae) (Austral. J. Herpet. vol 12, 2012), pp. 65-76.

[3] G. Vogel and P. David, On The Taxonomy Of The Xenochrophis Piscator Complex (Serpentes, Natricidae) (In Proceedings Of The 13th Congress Of The Societas Europaea Herpetologica, 2006), pp. 241: 246.

[4] A. C. Tajalli, Wiradityo dan I. M. Wijaya, Reptil Taman Nasional Bukit Baka Bukit Raya Dan Pemanfaatannya Secara Tradisional Oleh Masyarakat Dayak. Kalimantan Barat (Program Kreatifitas Mahasiswa, Depertemen Konservasi Sumberdaya Hutan, 2012), pp. 1-10.

[5] N. V. Rajesh, Rajesh, K. D. Jayathangaraj, M. G., Raman, M., And Sridhar, R, Parasitic Fauna Of Captive Snakes In Tamilnadu, India (Asian Pacific J.Trop.Dis. vol 5(7), 2015), pp. 547-551.

[6] C. R. Kennedy, Ecology of the Acanthocephala, Cambridge University Press, Cambridge. 2006.

[7] S. R. Goldberg and C. R. Bursey, Oligacanthorhynchid Acanthocephalan cystacanths in the yaqui Blackhead Snake, Tantilla yaquia (Serpentes: Colubridae) from Arizona (J. Arizonia-Nevafda Acad. Sci vol 37, 2004), pp. 83-84.

[8] A. G. Hill, P. W. Ladds and D. M. Spratt, Acanthocephalan Infection and Sparganosis in a Green Tree Snake (Dendrelaphis punctulata) (Austral.Vet.J. vol 92(9) (2014), pp. 362-364.

[9] A. H. R Soheir, E. Z. Mohey, AbdEl-Latif, I. M. Nadia and F. E. Obaida, Description of Some Acanthocephalan Species from Some Reptiles in Qena Governorate (J.Phar.Biol.Sci. vol 10(2), 2015), pp. 31-36.

[10] R. Poulin, M. Wise and J. Moore, A Comparative Analysis of Adult Body Size and Its Correlates in Acanthocephalan Parasites, (Inter.J.Par. vol 33(8), 2003), pp. 799-805.

[11] C. B. Daniels and M. P. Simbotwe, The Biology of Acanthocephalan Parasites of Australian Skinks (J.Herpet. 1984), pp. 211-213.

[12] O. M. Amin, C. Wongsawad, T. Marayong, P. Saehoong, S. Suwattanacoupt and O. Sey, Sphaerechinorhynchus macropisthospinus sp.n. (Acanthocephala: Plagiorhynchidae) from Lizards, Frogs, and Fish in Thailand (J.Helminth.Soc.Washington vol 65(2), 1988), pp. 174-178.

[13] Centers of Disease Control and Prevention (CDC) DPDx, [Cited February 2017] 2017, Laboratory Identification of Parasites of Public Health Concern (Center of Global Health, 2016), Available from https://www.cdc.gov/dpdx/acanthocephaliasis/index.html.