

# A new species of genus *Amoebotaenia alokni* sp. nov. From *Gallus gallus domesticus* from Ahmednagar district, (MS) India

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**Abstract:** Present communication deals with taxonomical studies to identified and describe a new species, about forty nine cestode parasites were collected from the gastrointestinal tract of *Gallus gallus domesticus* from different villages of Ahmednagar district for taxonomical studies. The genus *Amoebotaenia* was erected by Cohn L. in the year 1900, since from 1900 about 19 species are added in *Amoebotaenia* genus. After going through the literature the identified *Amoebotaenia alokni* n. sp. parasite is differ from the known species of the genus *Amoebotaenia* in distinct and differentiating characters like shape and size of the scolex, number of hook, testes, Proglottids and Shape and Size Ovary etc. Some additional characters are given in comparative chart at the end. These distinct characters are more than enough to erected a new species from this genus and hence the name *Amoebotaenia alokni* n.sp.

**Index Terms:** *Amoebotaenia*, *Gallus gallus domesticus*, Parasites, Cestode.

## I. INTRODUCTION

Taxonomy playing important role in the important fields of applied Zoology and it also provides a workable and heuristic framework within which biodiversity is recognized and species characterization occurs (Dar *et.al*, 2003). Heavy helminthes infection in poultry causes direct economic losses through mortalities and a drop in egg-laying capacity. (Yamaguti, S 1940). Helminthes parasites causing weakness and severe disease, which may result into death of the host if not treated properly. (Wankhed H J, *et.al*, 2016). Helminth parasites of birds are commonly divided into three classes: Nematode, Cestode and Trematodes. There are a number of approaches, such as morphological, ecological, genetically, biochemical and others, which have contributed a lot in taxonomic studies. The use of morphological taxonomic technique still dominates and is

considered as a valuable tool in describing, naming and identifying the organism in a convenient manner (Kapoor, 1998) Taxonomy is a basic tool for describing and explaining biological diversity. It also acts as historical framework for bio-control, biogeography, ecology and evolution. Taxonomic data is challenging to handle. Some of the taxonomic data types include photographs of living specimens, dissection, observation, specimen data, original descriptions, identification keys and geographical areas. The genus *Amoebotaenia* was erected by Cohn in 1900, with as different type species; about So far 19 species of *Amoebotaenia* are reported. The aim of this work is to study morphological characteristic of parasite i.e. phenotypic study of parasite. Current classifications of cestode are mainly based on morphological traits in adult parasitic phenotypes.

## II. MATERIALS AND METHODS

### A. Sample Collection:

The present work was carried out in the Ahmednagar district, (MS). Total 49 intestines were collected from slaughter house of different villages of Ahmednagar district, out of 49 intestine 27 intestines are infected with helminthes parasites selection of intestines of different age groups and both sexes during the period from June-2017 to May- 2018.

### B. laboratory Examination:

In laboratory working the gastrointestinal tract of host was opened in a longitudinal section with forceps, cestode parasites were removed from the dissected gastrointestinal tract and it fixed with hot 4% formalin, all cestodes were counted before being fixed and preparation of permanent slides by staining and mounting.



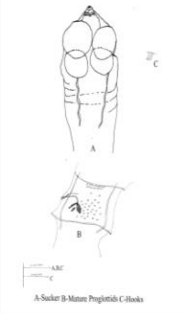
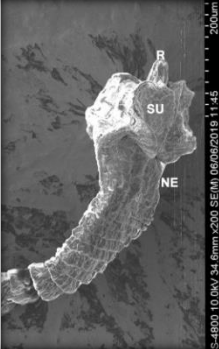
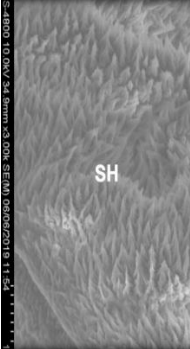
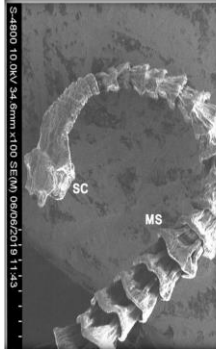
### C. Scanning Electron Microscopy:

For SEM Cestode were fixed in 4% neutral phosphate-buffered formaldehyde at 4°C at least for 24 h. After post fixation in 1% buffered osmium tetroxide for 1h, the worms were washed with PBS. Subsequent dehydration was carried out through ascending concentration of acetone up to pure acetone. Following the standardized scanning electron microscopic methods. (Dey *et.al.* 1989; Roy and Tandon, 1991).

*D. Camera lucida and Identification*

All the drawing was made with the aid of Camera Lucida. All measurements are in millimeters, unless otherwise indicated. Parasitological examinations were performed by standard methods, identify the cestodes as per key (Soulsby 1982) and the identification of parasite is made with the help of “Systema Helminthium” Vol. II. “Cestode of Vertebrates” (Yamaguti S, 1959)

III. RESULTS AND DISCUSSION

		
Fig-1 Photograph showing of scolex of cestode parasites rostellum and sucker.	Fig-2 Photograph showing mature segment of cestode parasites.	Fig-3 Camera Lucida drawing showing scolex and mature segment of cestode parasites
		
Fig-4 Scanning Electron Microscopy image of scolex containing rostellum, Suckers and neck	Fig-5 Scanning Electron Microscopy image of Suckers Hooks	Fig-6 Scanning Electron Microscopy image showing Entire cestode parasites

All the cestodes were small, flattened, having few proglottids creamy white in color, having scolex, consisting of 40-45 proglottids having followed by short neck, immature and mature segments. The worm measures 20-120 mm in length. Scolex is small, oval in shape, narrow anterior posteriorly, anterior end of

the scolex protruded as Rostellum, with four prominent suckers, sharply constricted at posterior margin followed by neck, immature segments and measures 0.3179 (0.3155-0.3203) in length and 0.03074 (0.3090 -0.3058) in breadth. Rostellum is well developed, small and oval in shape, retractile, situated at the apex of scolex. It is armed with crown single circle of hooks and measures 0.0557 (0.0533-0.0582) in length and 0.0655 (0.0631-0.0679) in breadth. Rostellar hooks are 18-20 in numbers, with crown single circle, long, elongated shaped and pointed at the apex and measures 0.0165 (0.0160-0.0171) in length and 0.0037 (0.0032-0.0042) in breadth. Sucker are four in numbers, large and round in shape, arranged in two pairs, overlapping and measures 0.1529 (0.1359 -0.1699) in diameter. Neck short and broad followed by immature, mature and gravid segments which measures 0.1237 (0.1213 - 0.1262) in length and 0.2936 (0.2912 - 0.2961) in breadth. Mature proglottids are two times longer than broad, craspedote, with slightly concave-convex lateral margins having short blunt, round, conical projections at the posterior corners, and measures 0.6874 (0.6881-0.6931) in length and 0.9710 (0.9649 -0.9772) in breadth. Testes are 35-40, medium and rounded in shape, anterior sides of ovary, evenly distributed, within the middle part of mature proglottids and measures 0.0107 (0.0113-0.0227) in diameter. Cirrus pouch is well developed, small and oval in shape, placed at anterior side of the segment, anteriorly directed and measures 0.0624 (0.0568 - 0.0681) in length and 0.0397 (0.0340-0.0454) in width . Cirrus is thin tube, protrusible, curved, within the cirrus pouch and measures 0.1193 (0.1136 - 0.1250) length and 0.0170 (0.0113-0.0227) in width. Vas deferens is short thick, spiral, and measures 0.1647(0.1590-0.1704) in length and 0.0170 (0.0113-0.0227) in width. Ovary is bilobed, elongated, both lobed irregular in shape, aporal lobe is larger than poral lobe, it measures 0.2102 (0.2045 -0.2159) in length and 0.0738 (0.0681-0.0795) in breadth. Vagina is thin tube, slightly curved, runs parallel to cirrus pouch and measures 0.2556 (0.2500 -0.2613) in length and 0.0170 (0.0113-0.0227) in breadth. Ootype is small in size, oval to round in shape, anterior-ventral and lateral to the ovary and measures 0.0113 in diameter. Vitelline gland is large and compact, oval and cup shaped, present posterior side of ovary and measures 0.0965 (0.0909 - 0.1022) length and 0.0397 (0.0340 - 0.0454) in width. Longitudinal excretory canals are long tube, paired, running across proglottids, longitudinally on both the side of proglottids and measures 0.7102 (0.7045-0.7159) in length 0.0298 (0.0227 - 0.0340) in breadth.

After going through the literature given parasites differs from in the number of hooks and number of Proglottids and differs from the same in few characters which are summarized below.

1. Given parasites differs from *A. sphenoides*, (Chon,1899) in number of segment (40-45 Vs.16-23), and number of testes

- (35-40 Vs. 12-14), and host (*Gallus domesticus* as against *Vanellus dongolanus*)
2. The present tapeworm differs from *A. brevicollis*, (Fuhrmann, 1907) in number of segment (40-45 Vs.24), number of testes (35-40 Vs.12-15), host (*Gallus domesticus* as against *Charadrius nubicus*),
  3. Given parasites differs from *A. vanelli*, (Fuhrmann, 1907) in number of segments (40-45 Vs. 25) and number of testes (35-40 Vs.18-20), host (*Gallus domesticus* as against *Vanellus dongolanus*), and locality (India Vs. Egypt).
  4. Given parasites differs from *A. fragida* (Meggit, 1927) in number of hooks (18-20 single circle, elongated in shape Vs. 30, 0.051 long in two rows), mature proglottids (40-45 vs.12), and number of testes (35-40 vs. 11-15 in two rows).
  5. Given parasites differ from *A. pekinensis*, (Tseng, 1932) in number of segments (40-45 Vs. 16-20), and number of testes (35-40 Vs.12- 20), host (*Gallus domesticus* as against *Charadrius veredus*), and locality (India Vs. Peking).
  6. Given parasites differs from *A. fuhrmanni* (Tseng, 1932) in having number of proglottids (40-45 Vs.17-31), number of rostellar hooks (18-20 elongated shape Vs. 10, long) and number of testes (35-40 Vs. 12-16), host (*Gallus domesticus* as against *Gallinago sp.*), and locality (India Vs. Nanking).
  7. Given parasites differs from *A. oligorchis* (Yamaguti, 1935) in number of mature proglottids (40-45 Vs. 28), rostellar hooks (18-20 elongated shape Vs. 33 long) and number of testes (35-40 spread transversally in posterior lateral margin of segment Vs. 6 spread transversally in posterior lateral margin of segment), Locality (India Vs. Japan).
  8. Given parasites differs from *A. indiana*, (Shinde, 1972) in having number of segments (40-45 Vs.14-15), number of rostellar hooks (18-20 elongated shape Vs. 10 long) and number of testes (35-40 Vs. 10-12), scolex shape (oval shape narrow anteriorly and posteriorly Vs. small, oval),
  9. Given parasites differs from *A. megascolesis*, (Shinde, 1972) in number of segments (40-45 Vs. 14-16), number of testes (35-40 Vs. 14-17), scolex shape (oval shape narrow anteriorly and posteriorly Vs. quadrangular), Neck (present Vs. absent), vitelline gland (Oval, cup shape Vs. compact), host (*Gallus domesticus* as against *Francolinus pondicerianus*),
  10. Given parasites differs from *A. maharashtrii*, (Shinde,1972) in number of segments (40-45 Vs. 15) and number of testes (35-40 Vs. 11), scolex shape (oval shape narrow anteriorly and posteriorly Vs. quadrangular), Neck (present Vs. absent),
  11. Given parasites differs from *A. cohni*, (Kalyankar and Palladwae, 1975) in number of proglottids (40-45 Vs. 15-18), number of rostellar hooks (18-20 elongated shape Vs.12) number of testes (30-35 Vs. 8-9).
  12. Given parasites differs from *A. kharatia*, (Kalyankar and Palladwae, 1975) in number of proglottids (40-45 Vs. 16), numbers of hooks (18-20 Vs. 18) and number of testes (35-40 Vs. 13-15).
  13. Given parasites further differs from *A. bhonslei* (Gaikwad, 1980) in number of mature proglottids (40-45 Vs. 12), and number of testes (35-40 spread transversally in posterior lateral margin of segment Vs. 27-28 serially arranged along posterior margin).
  14. Given parasites differs from *A. domesticus* (Ghare, *et.al.*, 1979) in having shape and size of scolex (oval shape narrow anteriorly and posteriorly Vs. Small, quadrangular), mature proglottids (40-45 Vs. 10-12), number of testes (35-40 spread transversally in posterior lateral margin of segment Vs. 10 arranged serially along the posterior margin of segments), vitelline gland (Cup shape Vs. compact).
  15. Given parasites further differs from *A. mohekarae*, (Jadhav, 2004) in shape and size of scolex (oval shape narrow anteriorly and posteriorly Vs. globular), rostellar hooks (18-20 Vs. 24), mature segments (40-45 in number and two times longer than broad with posteriorly blunt projection Vs. three times broader than long), number of testes (35-40 Vs. 34-35),
  16. Given parasites differs from *A. soyagaonesis*, (Khadap, 2005) in having the presence of number if rostellar hooks (18-20 Vs. 46), number of testes (35-40 Vs. 53-56), and number of segments (40-45 Vs.44).
  17. Given parasites further differs from *A. jadhavae* (Jadhav *et.al.*, 2009) in size and shape of scolex globular (oval shape narrow anteriorly and posteriorly Vs. large and rectangular), number of hooks (18-20 Vs. 46), cirrus pouch (globular Vs. oval), and vitelline gland (Cup shape Vs. oval).
  18. Given parasites differs from *A. bhujangi*, (Garad, 2010) in shape of scolex (oval shape vs. squarish), and arrangement of rostellar hooks. (18-20 elongated shape Vs. single circle) mature proglottids (40-45 in number, two times longer than broad with posteriorly blunt projection vs. squarish, 0.181 x 0.234 mm) number of testes (35-40 Vs. 28) and host (*Gallus domesticus* as against *Venellus malbaricus*)
  19. Given parasites further differs from *A. minuta* (Nanware, 2011) in having arrangement of rostellar hooks. (18-20 elongated shape Vs. double circle), number of testes (35-40 Vs. 30-40) shape of ovary (bilobed, both lobed irregular in shape One lobe is larger than other Vs. 'V' or 'U' shaped ), position of genital pore (regularly alternate Vs. irregularly alternate), host (*Gallus domesticus* as against *Venellus malbaricus*),

Some additional distinct and differentiating characters are given in comparative chart at the end. These distinct characters are more than enough to erected a new species from this genus and hence the name *Amoebotaenia alokni* n.sp.

### III. CONCLUSION

As observed from the results obtained, present investigation consists of Sample collection, Laboratory examination, Scanning electron microscopy, Camera lucida.

After going through literature conclude that given identified cestode parasites found in *Gallus gallus domesticus*. Which is differ from the known species of the genus *Amoebotaenia* in distinct and differentiating characters like shape and size of the scolex, number of hook, testes, Proglottids and Shape and Size Ovary etc. Some additional characters are given in comparative chart at the end. These distinct characters are more than enough to erected a new species from this genus and hence the name *Amoebotaenia alokni* n.sp.

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