



MORPHO-TAXONOMIC STUDIES ON NEW CESTODE OF GENUS GANGESIA (WOODLAND, 1924) FROM WALLAGO ATTU (BLEEKER, 1851)

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ABSTRACT

Present study deals with description of new Proteocephallidean Cestode genus *Gangesia* Woodland, 1924 viz. *Gangesia intestinalis* Sp. Nov. collected from intestine of freshwater fish host *Wallago attu* (Bleeker, 1851) at Udgir Dist. Latur (M.S.) India during the period of February, 2012 to January, 2014. *G. intestinalis* Sp. Nov. comes closer to all known species of genus *Gangesia* Woodland, 1924 in general topography of organs but differs due to scolex Triangular, arrow shaped, suckers four, medium, rostellum is prominently encircled by a double row of hooks, which are 24 in numbers, neck long, mature proglottids six times broader than long, testes medium, oval to rounded, scattered throughout the anterior region of the segment, pre-ovarian, 40-45 in numbers, cirrus pouch elongated, cylindrical in shape, cirrus thin, tubular, lies within the cirrus pouch, vas deferens long tube, genital pore rounded marginally placed, unilateral, vagina thin, tubular, runs posterior to cirrus pouch, seminal receptaculum thin, tubular, ovary bilobed, excretory canal is long, running across the segment, vitellaria granular, gravid proglottid are three times longer than broad, uterus branched and eggs oval.

Key words: *Gangesia intestinalis* Sp. Nov., Proteocephallidean Cestode, Taxonomic Studies, *Wallago attu* (Bleeker, 1851).

INTRODUCTION

Southwell (1913 a) described *Ophryocotyle bengalensis* from *Ophiocephalus striatus* and *Labeo rohita*. Woodland (1924) created the genus *Gangesia* for the reception of *G. wallago* and *G. macrons*. It was found by Woodland (1924,1925) and Verma (1928) that the form, described by Woodland as *G. wallago* was identical to the form, *O. bengalensis* described by Southwell. The description given by Southwell was very meagre and Verma (1928) gave a fresh account of the same form. In the same paper Verma also described *G. pseudotropii* from *Silurus garua* and *G. agraensis* from *Wallago attu*. Southwell (1930), however recognized only three valid species of the genus, other being regarded as synonyms. Yamaguti (1934) added *G. parasiluri*, thereby making four species under the genus:-The species under this genus reported till today are as 01} *G. bengalensis*, (Southwell, 1913); Synonyms: (a) *Ophryocotyle bengalensis* Southwell, 1913, (b) *Gangesia wallago*, Woodland, 1924.,(c) *Gangesia agraensis*, Verma, 1928; 02} *G. macrones*, Woodland, 1924; 03} *G. pseudotropii*, Verma, 1928 ; 04} *G. parasiluri*, Yamaguti, 1934.

Later on, many workers reported and described some new species of *Gangesia* parasitizing freshwater fishes. It indicates that the genus *Gangesia* is very abundant and diversified. Kunwar Suresh Singh, 1948 reported

G. lucknowia from *Eutropiichthys vacha* (Day), at Lucknow, U.P. India. *G. pseudobagrae* was described by Chenyen Hein, 1962. Roitman and Freze, 1964 reported two species viz. *G. polyonchis* and *G. oligorchis*. *G. sindensis* (Rafiya Rehna and Fatima M. Bilquees, 1971) was reported from freshwater fish *Wallago attu* of Karli Lake, Sind, West Pakistan. Rafiya Rehna and Fatima M. Bilquees, 1973 described *G. spinocirrosa* from freshwater fish *Wallago attu* of Karli Lake, Sind, West Pakistan. Dhar and Fotedar, 1979 reported *G. jammunensis* from intestine of *Wallago attu*, Jammu, India and *G. kashmirensis* from intestine of *Glyptosternum sp.* at Baramulla. *G. sanehensis*, (Malhotra *et al.*, 1980) was reported from *Cirrhina mrigala* and *Wallago attu* at Saneh Road, Kotdwara (Garhwal), U.P., India. Malhotra, *et al.*, 1981 was described *G. mehmdabadensis* from *Mystus tengra*, at Mehmdabad. Gupta and Arora, 1982 reported *G. haryanae* from *Wallago attu*. *G. indica* was described by Gupta and Parmar, 1982 from intestine of *Wallagonia attu* (Bloch), Lucknow, India. Seth and Capoor, 1982 reported *G. hanumanthai* from *Wallago attu*, Allahabad, India. *G. paithenesis* (Jadhav *et al.*, 1983) was collected from *Barbus ticto* at Paithan M.S., India. *G. fotedari*, was reported by Dhar and Majdah, 1983 in intestine of *Glyptothorax sp.* at Walur Lake, Kashmir. Deshmukh and Shinde, 1989 reported *G. shindei* from *Glyptothorax*. Shinde and Wankhede, 1990 described *G. aurangabadensis* from *Macrones singhala* and *G. sumani* from intestine of *Mastacembelus armatus*, at Paithan Dist. Aurangabad, M.S. India. *G. margolosi* was reported by Takeshi Shimazu, 1994 from Biwa catfish *Silurus biwaensis* caught in Lake Biwa, Shiga Prefecture, Japan. Hiware and Jadhav, 1995 was described *G. maharashtrii* from *Wallago attu*, Karad, Dist. Satara (M.S.), India. *G. dharurensis*, (Jadhav and Tat, 1997) was reported from *Wallago attu*, Ambachondi River, Dharur, India. Hiware, 1999 described *G. seenghali*, from *Mystus seenghala*, Satara M.S., India. *G. cirrhinae* was recorded by Patel, Shinde and Khan, 1999 in intestine of *Cirrhina mrigala* at Nanded Dist. Jalgaon, M.S., India. *G. rohita* (Shinde, Mahajan and Begum, 1999) was described from *Labeo rohita*, Adan Dam, Akola, M.S. India. Jadhav *et al.*, 2001 was recorded *G. clariusae* from *Clarias batrachus*, at Belgaum, Karnataka. *G. rohita (minor)* was reported by Pawar *et al.*, 2004 reported from *Labeo rohita*, at Dhanegaon Dam, Dist. Beed. Hemlata Wankhede, 2004 was described *G. mastacembali* from *Mastacemelus armatus*, in Godavari river at Aurangabad, M.S. India. *G. ambikaei* (Hiware *et al.*, 2004) was reported from *Wallago attu*. Begum, 2007 described *G. batrachusi* from *Clarias batrachus*. *G. pandeyae* was recorded by Kasar *et al.*, 2010 in intestine of *Wallago attu* from Dhamangaon Dist. Amravati (M.S.), India. Pradhan *et al.*, 2010 was reported *G. wallaguae* from intestine of *Wallago attu* in Dudhana Dam, Dist. Jalna M.S., India. *G. marathwadensis* (Bhure *et al.*, 2011) was recovered from intestine of *Wallago attu*, M.S. India. Reddy *et al.*, 2012 was reported by *G. (G.) bendsurensis* from *Wallago attu* at Bendsura dam, Beed district, M.S. India. Bhaware *et al.*, 2012 was described *G. jayakwadensis* in intestine of a freshwater fish *Clarias batrachus* from Jayakwadi project at Paithan, Dist. Aurangabad. *G. (G.) striatusii* was recorded by Bhure and Nanware, 2012 from intestine of *Channa striatus*, Omerga Dist. Osmanabad (M.S.), India. Dhole *et al.*, 2012 described *G. shivajiraoi* from intestine of *Wallago attu* (Bleeker, 1851), M.S. India. Recently Deshmukh *et al.*, 2016 added *Gangesia orientalis* from *Wallago attu*.

MATERIALS AND METHODS

During survey of cestode parasites of freshwater fishes, One Hundred Sixty Two cestodes were collected from the One Hundred Twelve infected intestines out of Two Hundred Forty examined freshwater fish host *Wallago attu* (Bleeker, 1851) at Udgir Dist. Latur (M.S.) India during the period of February, 2012 to January, 2014. Collection of parasites, preservation, staining, mounting and Identification was done by standard methods (Gerald D. Schmidt, 1934; Yamaguti, S., 1959; Wardle, R.A., Mcleod, J.A. and Radinovsky, 1974; Khalil, Jones and Bray, 1994). All measurements are recorded in millimeters.

RESULTS (Description Based on Seven Specimens)

Scolex is Triangular, arrow shaped, distinctly marked off from the segment. It bears four suckers and prominent rostellum and measures 0.7844 (0.7208-0.8480) × 0.5936 (0.3180-0.8692) mm in length and width. There are four medium suckers, which are arranged in a line, almost rounded, muscular and measures 0.2438

(0.1998-0.2968) × 0.2332 (0.1696-0.2968) mm in length and width. The rostellum is prominently encircled by a double row of hooks and measures 0.2438 (0.1908-0.2968) × 0.2756 (0.2120-0.3392) mm in length and width. Rostellar hooks are 24 in numbers and measures 0.1148 (0.112-0.1176) × 0.014 (0.0112-0.0168) mm in length and width. The neck is long and measures 1.017 (0.954-1.06) × 0.614 (0.530-0.699) mm in length and width. The mature proglottids are six times broader than long and measures 0.477 (0.424-0.530) × 3.710 (3.604-3.816) mm in length and width. The testes are medium, oval to rounded, scattered throughout the anterior region of the segment, pre-ovarian, 40-45 in numbers and measures 0.0636 (0.0424-0.0848) × 0.0848 (0.0636-0.106) mm in length and breadth. The cirrus pouch is elongated, cylindrical in shape, marginal and measures 0.3816 (0.3604-0.4028) × 0.1325 (0.106-0.159) mm in length and width. The cirrus is thin, tubular, lies within the cirrus pouch, measures 0.2491(0.2332-0.2650) × 0.0212(0.0106-0.0318) mm in length and width. The vas deferens is long tube, measures 0.3074(0.2968-0.3180) × 0.0318(0.0212-0.0424) mm in length and width. Vagina and cirrus pouch open through a common genital pore which is rounded in shape, marginally placed, unilateral and measures 0.0954(0.0848-0.106) × 0.053 (0.0424-0.0636) mm in length and width. The vagina is a thin, tubular, start from the genital atrium, runs posterior to cirrus pouch, measures 1.468(1.431-1.505) × 0.0265(0.0212-0.0318) mm in length and width. The seminal receptaculum is thin, tubular, joins to the ootype and measures 0.609 (0.583-0.636) × 0.0371 (0.0318-0.0424) in length and width. The ootype is almost rounded, compact, measures 0.106 mm in diameter. The ovary is bilobed, occupies posterior part of the segment, measures 1.166 (1.06-1.272) × 0.0848 (0.0636-0.106) mm in length and width. The excretory canal is long, running across the segment longitudinally on both sides of the segment and measures 0.6254 (0.6148-0.6360) × 0.0318 (0.0212-0.0424) in length and width. The vitellaria are granular on either lateral sides of the segment. The gravid proglottid are three times longer than broad, measures 4.132 (3.990-4.275) × 1.097 (0.997-1.197) mm in length and width. The uterus is branched, measures 0.344 (0.318-0.371) × 1.033 (0.901-1.166) mm in length and width. The eggs are somewhat oval in shape, measured 0.0462 (0.0420-0.0504) × 0.0224 (0.0168-0.0280) mm in length and width.



Fig.1: Microphotoplate and Camera Lucida Diagram of *Gangesia intestinalis* Sp. Nov.

DISCUSSION

Southwell (1913 a) described *Ophryocotyle bengalensis* from *Ophiocephalus striatus* and *Labeo rohita*. Woodland (1924) created the genus *Gangesia* for the reception of *G. wallago* and *G. macrons*.

The present new cestode comes closer to all known species of the genus *Gangesia* in general topography of organs, but differs from It come closer to all the species of *Gangesia* but differs from *G. bengalensis* Southwell, 1913 in having scolex fusiform, 166-232 × 284-298mm, rostellum distinct, hooks 28-42 in numbers, arranged in single row, suckers 100-125mm in diameter, neck short, strobilia broader than long, testes 100 in numbers, ovary bilobed, uterine diverticula 20-28 in numbers, cirrus sac extends 1/3rd across the segment and reported from *Ophiocephalus striatus*.

The present form differs from *G.macrones* Woodland, 1924 in having body 110×194mm, rostellum armed with 33 hooks, arranged in one rows, neck absent, strobilia 150-200 in numbers, ovary bilobed, testes 100 in numbers, uterus with 20-30 uterine diverticula, cirrus sac 1/4th -1/6th across the segment and reported from *Macrones seenghala*.

It differs from *G.pseudotropii* Verma, 1928 having hold fast organ broader at the middle, rostellar hooks 17-20 in numbers, arranged in one circle, testes 100-160 in numbers, arranged in two lateral fields, vas deferens continue inside the cirrus pouch, ovary bilobed, uterus with 30-40 lateral diverticulae and reported from *Pseudotropis garua*, India.

The present form differs from *G. parasiluri* Yamaguti,1934 in having scolex large, rostellum armed with many rostellar hooks, ovary bilobed, testes numerous, 20-24 lateral fold of uterine diverticula on each sides, yolk glands arranged in longitudinal strands and recovered from *Parasilurus asotus*.

The present Cestode differs from *G.lucknowia* Singh, 1948 in having body 100 mm, scolex oval, 0.417×0.365mm, bears armed rostellum, suckers four, rounded, armed with nine rows of spines, 0.18mm in diameter, spine measures 0.009mm, rostellum protrusible,0.167mm, armed with double rows of hook, hooks 50 in numbers, 0.039mm, neck short, 0.633mm, immature proglottids three and half times broader than long, mature proglottids square, 0.85mm, gravid proglottids one and half times broader than long, genital opening irregularly alternate, marginal, ovary bilobed, vitelline gland small, rounded, lies longitudinal strands, 0.06mm, shell gland lies just posterior to isthmus, 0.975mm, vagina posterior to cirrus pouch, uterus possessing 15-17 uterine diverticula on either side, eggs 0.043mm, having small hookless embryo, testes 130-135 in numbers, 0.06-0.062mm, vas deference coiled, cirrus pouch 0.27-0.28mm and reported from *Eutropiichthys vacha* (Day), at Lucknow, U.P. India.

It differs from *G. pseudobagrae* Chenyen Hein,1962 in having suckers 0.13-0.21mm, rostellar hooks 33-38 in numbers, 0.23-0.31mm, rostellum 0.16-0.23mm, testes 80-100 in numbers, cirrus pouch 0.22-0.24mm, uterine diverticula 11-20 in numbers and eggs 0.31-0.33mm.

The present form differs from *G. polyonchis*, Roitman and Freze, 1964 in having strobilia 35×2.43mm, scolex 0.2-0.27×0.27-0.34mm, suckers 0.1-0.16×0.09-0.015mm, armed with 4-6 rows of spines, rostellum 0.07-0.14×0.15-0.26mm, rostellar hooks 42-52 in numbers, 0.01-0.018mm, testes 96-166 in numbers, 0.014-0.017×0.045-0.056mm, cirrus pouch 0.25-0.60×0.07-0.22mm, receptaculum seminis 0.05×0.02-0.03mm, uterine diverticula 12-18 in numbers and eggs 0.016-0.024×0.01-0.02mm.

It differs from *G. oligorchis* Roitman and Freze,1964 in having strobilia 45-2.2mm, scolex 0.20-0.24×0.24-0.30mm, suckers 0.1-0.3×0.05-0.1mm, armed with 5-6 rows of spines, rostellum measures 0.026-0.034×0.034-0.068 mm, hooks 26-30 in numbers, 0.014-0.022 mm, testes 88-103 in numbers, 0.046-0.065×0.034-0.041mm, cirrus pouch 0.150-0.232×0.050-0.111mm, Vagina posterior to cirrus pouch, receptaculum seminis 0.017-0.023mm, uterine diverticula 8-12 in numbers, eggs 0.027-0.031×0.025-0.028mm and vitellaria follicular.

The present Cestode *G. intestinalis* Sp. Nov. differs from *G.sindensis* Rafiya Rehna and Fatima M. Bilquees,1971 in having body 29-57×1.033-1.362mm,scolex simple with four suckers and rostellum, 0.241-0.396×0.344-0.379mm, suckers 0.132-0.137mm, rostellum 0.138-0.172mm, armed with single crown of 25 hooks, hooks 0.03mm, neck short, 0.172-0.248mm, mature segment broader than long, 0.792-1.033×0.961-1.617mm, testes more than100 in numbers, arranged in one continous field, ovary post testicular, bilobed, transversly elongated, 0.207-0.929×0.241-0.757mm, cirrus sac 0.551mm, cirrus very long, 0.73-0.73mm, vagina posterior to cirrus pouch, uterus simple with 8-9 diverticula on each side, genital pore irregularly alternate and reported from freshwater fish *Wallago attu* of Karli Lake, Sind, West Pakistan.

It differs from *G. spinocirrosa* Rafiya Rehna and Fatima M. Bilquees,1973 in having body elongated, containing 35-65 mature and gravid proglottids,50-95-60×1.0-1.02mm, scolex 0.44-0.46×0.40-0.41mm, suckers four, cup shaped, 0.11-0.12mm, armed with minute spines, rostellum oval, armed with two rows of hooks, each row containing 22-25 hooks, 0.03-0.04mm, neck short, 0.10-0.13mm, mature proglottids 0.71-2.84×0.77-0.98mm, genital opening irregularly alternate, marginal, ovary bilobed, 0.17-0.29×0.57-0.60mm, vitelline glands follicular,

arranged in longitudinal strands, vagina delicate, 0.16-0.50×0.067-0.068mm, cirrus pouch 0.23-0.25×0.05-0.11mm, testes lies between the vitelline glands, arranged in two groups, 6-12 in each group, uterus with 14-20 uterine branches, eggs oval to spherical, embryonated, 0.045-0.050×0.050-0.058mm and reported from freshwater fish *Wallago attu* of Karli Lake, Sind, West Pakistan.

The present Cestode *G.intestinalis* Sp.Nov. differs from *G. jammuensis* Dhar and Fotedar,1979 in having body small, 1.0-2.0×0.98mm, scolex rounded,0.23×0.32mm, bearing prominent rostellum and four suckers, rostellum provided with apical sucker and single circlet of hooks, hooks rose thorn shaped, more than 30 in numbers, suckers provided with rows of minute spines, 0.4×0.1mm, apical sucker 0.15×0.13mm, neck short, 0.74×0.48mm, mature proglottids broader than long, ovary bilobed, each lobe measuring 0.62×0.73mm, testes 60-80 in numbers, in one continuous field, cirrus sac extends 1/3rd distance across the segment,0.28×0.12mm,genital pore regularly alternate, vitelline glands throughout length of proglottids, shell gland 0.06mm, vagina thin tube, uterus elongated tube and reported from intestine of *Wallago attu*, Jammu, India.

The present Cestode *G.intestinalis* Sp.Nov. differs from *G. kashmirensis* Dhar and Fotedar,1979 in having body small, 1.0-2.0×1.1mm, scolex rounded,0.20×0.28mm, bearing prominent rostellum and four suckers, rostellum 0.52×0.14mm, provided with apical sucker and double rows of hooks, hooks rose thorn shaped, 30 in each rows, 0.26×0.21mm, suckers provided with rows of minute spines, 0.13mm, neck 0.36×0.22mm, mature proglottids broader than long, 0.67 ×0.85mm, ovary bilobed, each lobe measuring 0.31×0.15mm, testes 148 in numbers, cirrus sac extends 1/3rd distance across the segment,0.36×0.12mm, genital pore irregularly alternate, vitelline glands throughout length of proglottids, shell gland 0.07mm, uterus with 9-14 uterine diverticula and recovered from intestine of *Glyptosternum sp.* at Baramulla.

New form differs from *G. mahamdabadensis* Malhotra et al.,1981 in having scolex small, hooks 66 in numbers, absence of neck, vas deferens coiled, ovary bilobed, vagina thick tube, uterus tubular, vitellaria follicular and reported from *Mystus tengra*, at Mehmdabad.

G.intestinalis Sp.Nov. differs from *G.sanehensis* Malhotra et. al., 1982 in having body medium, 17.25 × 2.915mm, scolex 0.475×0.512 mm, suckers spherical to oval, armed with 4-5 rows of spines, 0.193×0.164 mm, rostellum oval, protrusible, armed with single circle of hooks, 0.172-0.226mm, hooks 22-28 in numbers, 0.027-0.046mm, neck distinct, 0.685×0.432mm, mature proglottids broader than long, 0.437-0.787mm, testes spherical in shape, 112-184 in numbers, 0.024×0.031mm, vas deferens 0.019 mm, cirrus sac elongated, 0.423×0.098mm, cirrus spinose, 0.045-0.221mm, genital pore alternate irregularly, ovary follicular, 0.203×0.772mm, vagina posterior to cirrus pouch, 0.009×0.023mm, vitelline gland follicular, 2.774×0.174mm, ootype 0.080×0.054mm, uterus branched with 10-24 lateral fingerlike uterine diverticula, 2.226×1.207mm, eggs numerous, round to oval, 0.041×0.045mm and reported from *Cirrhina mrigala* and *Wallao attu* at Saneh Road, Kotdwara (Garhwal), U.P., India.

Differs from *G.haryanae* Gupta and Arora, 1982 in having suckers covered with 4-5 rows of spine, hooks 20 in numbers, neck short, testes 200 in numbers, vas deferens coiled, ovary bilobed, vagina runs anterior to cirrus pouch, uterus with 20 lateral diverticulae on each side and vitellaria follicular.

The present form differs from *G.indica* Gupta and Parmar, 1982 in having body 70-90×0.85-0.90 mm, scolex spherical, 0.27-0.30×0.25-0.29mm,suckers four, muscular, 0.12-0.14 mm, rostellum slightly protrusible, 0.11-0.13×0.19-0.21mm, with two rows of unequal hooks arranged in a chain, hooks 24-26 in numbers, 0.010-0.025mm, neck short, mature proglottids longer than wide, 1.00-1.20×0.88-0.92mm, genital opening irregularly alternating, 0.38-0.42 from anterior extremity, uterine pore absent, testes rounded, 100-110 in numbers,0.03-0.05mm, vas deferens coiled tube, cirrus pouch 0.28-0.30×0.12-0.14mm, cirrus unarmed, 0.14-0.16×0.05-0.07mm, ovary bilobed, 0.34-0.36×0.22-0.25mm, vitellaria follicular, arranged in longitudinal strands, uterus elongated sac, giving 18-20 diverticula on each side, eggs 0.01-0.02mm.

The cestode differs from *G. hanumanthai* Seth and Kapoor, 1982 due to Oval holdfast organ, hooks 24-26 in numbers, presence of neck , testes 45-75 in numbers, ovary bilobed, Vagina anterior or posterior to cirrus pouch, uterus with 10-16 uterine diverticula, vitellaria follicular and collected from *Wallago attu*, Allahabad, India.

New parasite differs from *Gangesia paithanensis* Jadhav et. al., due to triangular scolex, hooks 11 in numbers, neck absent, testes 280-300 in numbers, vas deferens short, ovary bilobed with few blunt acini, vagina anterior to cirrus pouch, uterus with 16-18 lateral diverticula, follicular vitellaria arranged in two rows.

It differs from *G. fotedari* Dhar and Majdah, 1983 in having body 9.54-14.28×0.62-0.77mm, scolex visible from strobilia, 0.16-0.32×0.26-0.37mm, suckers four, spherical to oval, 0.07-0.10mm, rostellum oval, protrusible, armed with hooks, 0.089-0.10×0.10-0.14mm, hooks 30-48 in numbers, rose thorn shaped, 0.016-0.024mm, neck distinct, 0.357-0.714mm, testes oval to spherical, 120-134 in numbers, 0.032-0.036×0.04mm, genital pore alternate irregularly, ovary follicular, each lobe measure 0.179-0.321mm, vitelline gland follicular, forming two lateral bands, uterus persistent, 0.232-0.285×0.017-0.035mm, 9-5 uterine diverticula, eggs oval to rounded and reported from *Glyptothorax sp.* at Walur Lake, Kashmir.

The present form *G. intestinalis* Sp. Nov. differs from *G. shindei* Deshumukh and Shinde, 1989 in having scolex distinct, somewhat triangular, rostellar hooks 28 in numbers, triangular, in single circle, neck present, testes 180-190 in numbers, uterus Tubular, cylindrical, vitellaria granular and reported from *Glyptothorax*.

It differs from *G. aurangabadensis* Shinde and Wankhede, 1990 in having Scolex oval, broader in middle and tapering at both ends, 0.854×0.582 mm, rostellum oval, armed with two circle of hooks, 0.220×0.270mm, rostellar hooks 48 in numbers, 0.035-0.046×0.003-0.037 mm, suckers four, with thin musculature, rounded, 0.039-0.250×0.350-0.700 mm, segments wider, 0.922×1.54mm, testes 350-360 in numbers, rounded, spherical, scattered in single field, 0.043-0.082×0.033-0.067 mm in size, cirrus sac oval, 0.145×0.072-0.111 mm, cirrus coiled, genital opening marginal, 0.082×0.019 mm, ovary bilobed, 0.970×0.169 mm, uterus tube like, 0.572×0.121-0.431mm and reported from *Macrones singhala*, at Paithan, Dist. Aurangabad (M.S.), India.

The *G. intestinalis* Sp. Nov. differs from *G. sumani* Shinde and Wankhede, 1990 in having scolex well marked with rostellum and suckers, 0.161×0.284mm, rostellum triangular, 0.083×0.171mm, hooks 0.013-0.085×0.004-0.040 mm, suckers four, oval, 0.051×0.046 mm, neck absent, mature proglottids longer than broad, 5.63×0.499-0.984 mm, testes 103 in numbers, in two fields, 0.120-0.187×0.051mm, cirrus pouch elongated, submarginal, 0.227×0.028 mm, ovary bilobed, each lobe kidney shaped, 0.456×0.158 mm, 2.90×0.60 mm, uterus tubular.

The present parasites differs from *G. margolisi* Takeshi Shimazu, 1994 in having scolex simple, oval, rostellum biconvex lens, hooks 31-41 arranged in single circle, suckers cup shaped, neck long, 2.24-3.20 mm, proglottids acraspedote, longer than broad, testes 135-203 in numbers, globular, cirrus pouch claviform, cirrus unarmed, vas deferens Ventral to testes, genital pore irregularly alternate, ovary Bilobed, uterus 'I' shaped, vitellaria follicular, arranged in bands and reported from Biwa catfish *Silurus biwaensis* caught in Lake Biwa, Shiga Prefecture, Japan.

The *G. intestinalis* Sp. Nov. differs from *G. maharashtrii* Hiware and Jadhav, 1995 in having scolex triangular, muscular, 0.330-0.350×0.364-0.519mm, suckers four, oval, muscular, overlapping to each other, 0.170-0.180mm, rostellum oval, armed with 40-50 single circle of hooks, 0.083-0.121×0.156-0.214mm, fusiform cirrus sac measure 0.592×0.078-0.150mm, cirrus thin, curved, 0.601×0.010-0.015mm, ovary butterfly shaped, ovarian lobe 0.776-0.780×0.146-0.194mm, vagina 0.689×0.010-0.019mm, ootype rounded, genital pore irregularly alternate, marginal, 0.039-0.043mm, uterus sac like, and measures 0.689-0.699×0.146-0.242 mm.

It differs from *G. dharurensis* Jadhav and Tat, 1997 in having scolex globular, 0.350-0.591× 0.255-0.530 mm, suckers four, large, 0.196-0.210×0.180-0.210mm, rostellum rounded, encircled by two opposite rows of hooks, 0.122-0.135×0.214-0.270 mm, rostellar hooks 35-40 in numbers, vagina 1.192-1.198×0.026-0.049mm, genital pore marginal, regularly alternate, 0.172-0.177×0.046-0.049mm, uterus sac like, 0.572-0.582×0.117-0.140mm.

It differs from *G. seenghali* Hiware, 1999 in having scolex globular, muscular, 0.388-0.398×0.252-0.543mm, rostellum big, oval, armed with single circle of hooks, 0.160 ×0.194-0.233mm, hooks 36-38 in numbers, 0.030-0.043×0.004-0.018mm, suckers oval, rounded, 0.146-0.150mm, neck absent, segment long, 1.698-2.007×0.621-0.894mm, testes 220-230, 0.053×0.030-0.038mm, ovary bilobed, 'H' shaped, 0.606×0.280-0.576 mm, vagina

funnel shaped, 0.849×0.015-0.053 mm, genital pore marginal, slit like, uterus tubular, with 18-19 blunt, small diverticula and reported from *Mystus seenghala*, Satara M.S., India.

G.intestinalis Sp.Nov. differs from *G.cirrhinae* Patel, Shinde and Khan, 1999 in having scolex large, square, 0.616×0.665mm, rostellum armed with hooks, arranged in five rows, 0.184×0.282mm, rostellar hooks triangular, 27 in numbers, 0.024-0.040×0.015-0.027mm, suckers four, large, oval, 0.155-0.214×0.252-0.277mm, neck short, 0.136-0.243×0.427-0.485mm, mature segment longer than broad, 1.304-1.439×0.67-0.83mm, testes medium, 100-110 in numbers, 0.038-0.076×0.030-0.045mm, cirrus pouch pear shaped, 0.371×0.121-0.182mm, cirrus coiled, vas deferens coiled, ovary bilobed, 'U' shaped, 0.849×0.121-0.235mm, vagina anterior to cirrus pouch, 1.212×0.015-0.038mm, genital pore medium, 0.136×0.030-0.038mm, uterus with central stem and numerous branches, 1.061-1.781×0.811-0.917mm, eggs oval, 0.011-0.015×0.011-0.013mm and reported from *Cirrhina mrigala* at Nanded Dist. Jalgaon, M.S., India.

The present form differs from *G. rohita* Shinde, Mahajan and Begum, 1999 in having scolex large, globular, 0.398×0.403mm, suckers large, oval, 0.150×0.155mm, rostellum large, oval, 0.150×0.160mm, rostellar hooks triangular, 60 in numbers, 0.010×0.003mm, neck short, mature segment squarish, 0.437×0.660mm, testes medium, 140-150 in numbers, cirrus pouch medium, tubular, 0.78×0.010mm, ovary bilobed, 0.471×0.112mm, vagina 0.393×0.019mm, genital pore irregularly alternate, vitellaria follicular, arranged in 5-6 rows.

New Cestode differs from *G.clariusae* Jadhav *et al.*, 2001 due to scolex triangular, distinctly marked off with four large suckers and prominent rostellum, 0.495-0.534×0.262-0.534mm, suckers large, round to oval, arranged in pairs, 0.206×0.180-0.188mm, rostellum rounded to oval, 0.112-0.121×0.214-0.217mm, rostellar hooks 17-20 in numbers, long nail like, 0.027-0.029×0.002-0.003mm, neck long, mature segment 0.857-1.736×1.704-1.873mm, testes 85-90 in numbers, rounded to oval, 0.568-0.571×0.454-0.459mm, cirrus pouch small, 0.397-0.399×0.193-0.249mm, vas deferens short, straight, 0.011-0.017mm, ovary bilobed, long finger like lobe, 1.044-1.049×0.113-0.135mm, vagina thin, 1.152-1.155×0.022-0.045mm, genital pore marginal, irregularly alternate, uterus sec like, 0.543-0.549×0.113-0.135mm and reported from *Clarias batrachus*, at Belgaum, Karnataka.

The present form *G.intestinalis* Sp.Nov. differs from *G.rohita* (*minor*) Pawar *et al.*, 2004 in having scolex medium, oval with four suckers and rostellum, 0.230-0.354×0.320-0.368mm, rostellum large, oval at anterior tip of scolex, 0.141×0.121mm, rostellar hooks 30-32 in numbers, single pronged, almost triangular, 0.063-0.032×0.010-0.024 mm, suckers medium, oval, arranged in two pairs, overlapping to each other, 0.112-0.155×0.107-0.131mm, neck short, broader than long, 0.150-0.160×0.262-0.291mm, mature segment broader than long, 0.252-0.267×0.645-0.679 mm, testes 145-155 in numbers, oval, medium, 0.015-0.024×0.010-0.015mm, cirrus pouch marginal, medium, 0.097-0.012×0.039-0.043mm, vas deferens thin, short, curved, 0.097×0.005mm, ovary large, bilobed, lobes with 6-7 short, blunt round acini, 0.422-0.487×0.015-0.053mm, vagina thin, 0.447×0.005-0.015mm, ootype medium, oval, 0.029×0.024mm, vitellaria follicular, arranged in 3-6 rows on each side, 0.010×0.005mm, genital pore small, oval, irregularly alternate, 0.010×0.067mm and reported from *Labeo rohita*, at Dhanegaon Dam, Dist. Beed.

It differs from *G.mastacembali* Wankhede, 2004 in having scolex triangular with rostellum, four big, oval suckers, rostellar hooks 18, Broader at the base and tapering at the end, neck absent, testes 170-190 in numbers, oval, vas deferens long, coiled, ovary bilobed, with 4-6 acini, vagina posterior to cirrus pouch, uterus tubular, long and collected from *Mastacemelus armatus*, in Godavari river at Aurangabad, M.S. India.

Gangesia intestinalis Sp.Nov. differs from *Gangesia ambikaei* Hiware *et al.*, 2004 in possessing triangular hold fast organ, rostellar hooks 36-37 in numbers, lancet shaped, neck very short, testes 388 -400 in numbers, rounded in shape, vas deferens thin tube, ovary bilobed, butterfly shaped, vagina thin, curve tube and uterus sac like.

It differs from *G. batrachusi* Begum, 2007 in having scolex quadrangular, 0.291-0.388×0.194-0.379mm, rostellum oval, large, armed with double rows of hooks, 0.049-0.112×0.112-0.189mm, rostellar hooks arranged in two circles, nail like, 0.013-0.025×0.012—0.014mm, suckers large, oval, 0.150-0.170×0.126-0.141mm, neck medium, 0.539-0.737×0.320-0.388mm, mature proglottids squarish, 0.568-0.669×0.388-0.737mm, testes medium,

105-115 in numbers, 0.029-0.063×0.019-0.039mm, cirrus pouch cylindrical, 0.238-0.252 × 0.019-0.039mm, vas deferens coiled, thin, 0.534×0.005mm, ovary bilobed, butterfly shaped, 0.388-0.509× 0.083-0.194mm, vagina 0.572×0.005-0.010mm, uterus tubular, 0.451-0.476× 0.010-0.029mm, vitellaria follicular, arranged in 6-8 rows on each side, 0.005 mm and collected from *Clarias batrachus* at Godavari River at Gangapur.

The present form differs from *Gangesia pandeyae* Kasar et.al.,2010 due to scolex triangular, rounded anteriorly, broader in middle, muscular, 0.351× 0.371mm, suckers four, medium, rounded to oval, muscular, two on either side, 0.150×0.121mm, rostellum oval to rounded, armed with single row of hooks, 0.099×0.131mm, rostellar hooks 24-25 in numbers, triangular, 0.070×0.016mm, neck absent, mature segment wide, squarish, 1.791×2.606mm, testes 180-200 in numbers, oval, small, 0.041×0.024mm, cirrus sac rounded to oval in shape, 0.584×0.167mm, cirrus long, tubular, straight, 0.371×0.016mm, vas deferens long tube, slightly coiled, 0.560×0.012mm, ovary bilobed, right lobe 1.014×0.162mm, left lobe 0.864mm, vagina thick tube, 0.774×0.033mm, receptaculum seminis long, 1.123×0.043mm, genital pore marginal, unilateral, 0.048×0.026mm, gravid proglottids longer than broad, 1.449×1.201mm, uterus saccular, 1.308×1.058mm, eggs non operculated, vitellaria follicular, arranged in two rows.

It differs from *G. wallagae* Pradhan *et al.*, 2010 in having scolex triangular, with four suckers and rostellum, suckers four, arranged in two groups, overlapping to each other, rostellum round, encircled by single row of 17-20 hooks, mature segment longer than broad, testes rounded, 70-75 in numbers, cirrus pouch large, oval, cirrus coiled, vas deferens coiled, vagina posterior to cirrus pouch, genital pore oval, unilateral, ovary bilobed and uterus secular.

The *G.intestinalis* Sp.Nov. differs from *Gangesia marathwadensis* Bhure et.al.,2011 in having triangular hold fast organ with marked rostellum, hooks 18 in numbers, neck absent, testes 103 in numbers, oval to rounded, vas deference coiled, genital pore marginal, situated and anterior side of segment, ovary distinctly bilobed, lobes with 5-6 acini, vagina thin tube, posterior to cirrus pouch, enlarge at genital pores, uterus tubular, long extends up to the anterior ends, vitellaria follicular and arranged in single row.

It differs from *Gangesia (Gangesia) bendsurensis* Reddy et.al., 2011 in having body 76mm, scolex globular, 0.28-0.35 × 0.3155-0.7038mm, suckers four, muscular, 0.3689-0.3786 × 0.007-0.218mm, Rostellum with a double row of stout hooks, and measures 0.379 -0.398 ×0.0097.-0.243mm, rostellar hooks rose thorn shaped, 35-47 in number, 0.0097-0.107 ×0.010-0.024 mm, vagina 0.742-0.758× 0.008-0.045mm, ovary butterfly shaped, each lobe 1.022-1.045× 0.152-0.227 mm, genital pore irregularly alternate, 0.106-0.136 ×0.015-0.038mm, vitellaria follicular and uterus secular, 0.477-0.500 × 0.23 -0.091mm.

It differs from *G.jayakwadensis* Bhavare et.al., 2012 in having scolex large, quadrangular, rostellum armed with a double circle of hooks, one circle with 25 hooks, second circle with 29 hooks, mature proglottids squarish in shape, broader than long, testes 300 to 310 in numbers, ovary is large in size, distinctly bilobed, vitellaria are follicular, uterus tubular and reported intestine of a freshwater fish *Clarias batrachus* from Jayakwadi project at Paithan, Dist. Aurangabad.

G.intestinalis Sp.Nov. differs from *G. (G.) striatusii* Bhure and Nanware, 2012 in having in having scolex rounded, broader in middle and distinctly marked off towards posterior side, muscular, 0.528-0.655×0.107-0.466mm, suckers four, big, rounded, muscular, placed at corners, 0.136-0.160×0.126-0.141mm, rostellum oval to rounded, armed with three rows of 120-130 stout hooks, testes 0.039-0.043×0.025-0.029mm, cirrus pouch elongated, rounded to oval, obliquely placed, 0.087-0.107×0.015-0.043mm, cirrus thin, slightly curved, vagina anterior to cirrus pouch, 0.002-0.481mm, ovary bilobed, butterfly shaped, right lobe 0.277-0.379×0.034-0.199mm, left lobe 0.160-0.301×0.053-0.194mm, uterus sac like, 0.277-0.325×0.014-0.072mm, and recovered from intestine of *Channa striatus*, Omerga.

The parasites differs from *G. shivajiraoi* Dhole et. al.,2012 due to Scolex distinct, almost oval, globular, 0.447 × 0.385 mm, Consist of four big suckers, round to oval, muscular, overlapping on each other, 0.122 × 0.101 mm, rostellum with single row of stout hooks, 0.214 × 0.122 mm, rostellar hooks 19 in number, arranged irregularly on rostellum, rose thorn shaped, 0.315 ×0.020mm, Neck short, 0.101 × 0.574mm, Mature segment

squarish, slightly acraspedote, longer than broad, 1.040×0.784 mm, testes 218 – 232 in numbers, globular, small, 0.048×0.029 mm, cirrus pouch large, elongated, fusiform, 0.582×0.144 mm, Cirrus thin, curved, Vas deferens short, curved, tubular, Genital pore irregularly alternate, small, oval, marginal, 0.021×0.047 mm, Ovary bilobed, 0.407×0.258 mm, vagina thin tube, 0.096×0.012 mm, gravid segment two times longer than broad, 1.657×0.0916 mm, uterus with 10- 11 diverticula, 6.139×0.771 mm, eggs oval to elongated, 0.013mm and vitellaria follicular, 1 -2 rows.

G.intestinalis Sp.Nov. differs from *G orientalis* Deshmukh et.al.,2016 in having scolex is oval with marked rosetellum, 1.078×0.617 mm, rostellar hooks are 20-22 in numbers, 0.124×0.022 mm, neck short, 0.163×0.652 mm, mature proglottids are five times broader than long, 0.326×1.663 mm, testes are oval to rounded, scattered throughout the anterior region of the segment, 20-25 in numbers, 0.067mm, cirrus pouch is cylindrical, 0.107×0.062 mm, vas deferens is short tube, 0.067×0.017 mm, vagina 0.747×0.017 mm, ovary bilobed, 0.292×0.067 mm, gravid proglottid are five times broader than long, uterus sacular, 0.292×1.461 mm and eggs oval, 0.031×0.019 mm.

The above noted characters are valid enough to accommodate these worms under the genus *Gangesia* as a new species of the genus and hence the name *Gangesia intestinalis* Sp.Nov. The present species is named after the habit and habitat of worm.

Taxonomic Summary

Genus	: <i>Gangesia</i> Woodland, 1924
Species	: <i>Gangesia intestinalis</i> Sp.Nov.
Host	: <i>Wallago attu</i> (Bleeker, 1851)
Habitat	: Intestine
Locality	: Udgir Dist. Latur, M.S., India.
Prevalence	: One Hundred Sixty Two mature tapeworms collected from One Hundred Twelve infected host out of Two Hundred Forty examined.
Period of collection:	February,2012 to January,2014.
Number of Specimen:	162 (One Hundred Sixty Two)
Accession number:	PGDZ/YMN/01-07/ February, 2012 to January, 2014
Deposition	: Department of Zoology (UG & PG), Yeshwant Mahavidyalaya, Nanded.
Etymology	: The species is named habit and habitat of worm.

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