

Studies on avian cestode genus *Cotugnia* Diamare, 1893 (Cestoda: Davaineidae, Fuhrmann, 1907) from *Gallus Gallus domesticus*

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The present investigation deals with a new species of the genus *Cotugnia*, Diamare 1893 from the intestine of *Gallus gallus domesticus*, from Nanded (M.S.) of India. The new species *Cotugnia diamarei* Sp.Nov. comes closer to all known species of the genus *Cotugnia* in general topography of organ but differs due to scolex large, quadrangular, suckers four, oval to rounded, arranged in four corners, rostellum oval, large, placed in anterior region of scolex and having rostellar ring, rostellar hooks 53-55 in numbers, 'V' shaped, arranged in a single circle, neck short, mature proglottids three times broader than long, testes 62 in numbers, oval to rounded, postovarian, cirrus pouch cylindrical, cirrus short, curved tube contained within cirrus pouch, vas deferens thin, curved, vagina posterior to cirrus pouch and ovary bilobed.

Key words : *Cestoda*, *Cotugnia diamarei* Sp.Nov., *Davaineidae*, *Gallus gallus domesticus*.

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INTRODUCTION

Birds are important components of ecosystem. They are important from the ecological and economical point of view. Man uses many birds as delicious and nutritious food. Similarly birds also produce some important products like meat, eggs and beautiful feathers. The infections of cestode parasites are found in birds. There are no estimates of population suffering from cestode infection but infections are very common in people who are eating poorly cooked or uncooked meat, unhygienic habitats and poor sanitation. Infection leads to anemia. Parasitic diseases are the major public health problem of tropical countries including India. They infect man and also invade domestic birds and wildlife. Although the morbidity and mortality due to such infection is not alarming they adversely affect the general health, physical and mental health, growth of children and productivity of an adult.

Genus *Cotugnia* was erected by Diamare, 1893 with type species *C.digonopora* (Pasquale, 1890) collected from domestic fowl. So far the following species of the avian cestode Genus *Cotugnia* are reported.

- *C. digonopora* (Pasquale, 1890), Diamare, 1893.
- *C.polyacantha*, Fuhrmann, 1909.
- *C. cuneatea tenuis*, Meggitt, 1924.
- *C. joyeuxi*, Baer, 1925.

- *C. parva*, Baer, 1925.
- *C. fleari*, Meggitt, 1927.
- *C. bahli*, Johri, 1934.
- *C. intermedia*, Johri, 1934.
- *C. noctua*, Johri, 1934.
- *C. taiwanensis*, Yamaguti, 1935.
- *C. rimandoi*, Tubangui et Masilungan, 1937.
- *C. magna*, Burt, 1940.
- *C. aurangabadensis*, Shinde, 1969.
- *C. columbae* Shinde, 1969.
- *C. srivastavi*, Malviya and Datta, 1970.
- *C. magdoubii* Magzoubi and Kasim, 1980.
- *C. satpulensis*, Malhotra and Kapoor, 1983.
- *C. yamagutii* Shinde, 1985.
- *C. vishakhapatnamensis*, Kolluri, 1988.
- *C. rajivji*, Jadhav et al., 1994.
- *C. kamatiensis*, Kharade and Shinde, 1995.
- *C. chengmaii*, C. Wongsawad and Jadhav 1998.
- *C. manishae*, Shinde, 1999.
- *C. ganguae*, Shinde, 1999.
- *C. mehdii*, Mahajan et al., 1999.
- *C. alii*, Shinde et al., 2002.
- *C. sillodensis*, Jadhav et al., 2003.
- *C. singhi*, Pawar et al., 2004.
- *C. lohaensis*, Jadhav et al., 2004.

- *C.shankari*, Tat and Jadhav 2005.
- *C. liviae*, Patil *et al.*, 2005.
- *C.streptopelii*, G.P. Jadhav *et al.*, 2009.
- *C. hafezzi* Nanware *et al.*, 2010
- *C. indiana* Kasar *et al.*, 2010
- *C.indiana minor* Garad *et al.*, 2010
- *C. tetragona* Nanware *et al.*, 2011
- *C.orientalis* Nanware *et al.*, 2011

RESEARCH METHODOLOGY

During survey of cestode parasites of birds from Nanded district, (M.S.) India, Eleven cestode parasites were recovered from the intestine of *Gallus gallus domesticus* during March, 2012-May, 2012. These worms were preserved in hot 4 per cent formalin. The parasites were washed thoroughly for several times under running tap water, stained with borax carmine, dehydrated in ascending grades of alcohol, cleared in xylene, mounted in Canada Balsm. Camera lucida drawings were prepared by research microscope. All the measurements are recorded in millimeter.

RESEARCH FINDINGS AND ANALYSIS

The findings of the study have been discussed in detail as under:

(Description based on eleven alike specimens) (*Cotugnia Diamarei* Sp. Nov. Fig. 1)

All cestode were about 23 millimeter long, creamy whitish in colour having scolex, neck, immature and mature proglottids. The Scolex is large, quadrangular and measures 0.59 -0.72 x 0.68-1.04 mm in length and breadth. Rostellum medium, oval in shape and measures 0.21-0.25 x 0.39-0.46 mm in length and breadth. Rostellum armed with a single circle rostellar hook, 53-55 in numbers and measures 0.033-0.038 x 0.003-0.007 mm in length and breadth. Scolex bears four suckers, which is large, oval to rounded in shape, muscular, lie at four

corners and measures 0.165-0.192mm in diameter. The scolex is followed by neck, which is short and measures 0.47-0.83 x 0.82-0.91 mm in length and breadth.

Mature proglottids three times broader than long, with a double set of reproductive organs and measures 0.82-0.98 x 2.12 -2.71 mm in length and breadth. Testes oval to rounded in shape, arranged in single field, 62 in numbers and measures 0.055-0.061 mm in diameter. Cirrus pouch long, elongated, cylindrical, curved and measures 0.283-0.289 x 0.03-0.09 mm in length and breadth. Cirrus thin, curved and measures 0.21-0.25 x 0.008-0.012 mm in length and breadth, and forms vas deferens, which is thin, long, curved and measures 0.523 x 0.007 mm in length and breadth. Cirrus and vagina opens from common genital pores, which is small, oval to rounded, bilateral, marginally placed and measures 0.062-0.065 x 0.024-0.027 mm in length and breadth.

Vagina thin tube, opens from genital pores, posterior to cirrus pouch and measures 0.057-0.059 x 0.01-0.03 mm in length and breadth, and forms receptaculum seminis which is thin, sac like, fusiform and reaches to ootype and measures 0.14-0.16 x 0.052-0.054 mm in length and breadth. The ootype is small, oval to round in shape, post ovarian and measures 0.134-0.138 x 0.05-0.07 mm in length and breadth. The ovary bilobed and measures 0.371-0.374 x 0.09-0.14 mm in length and breadth. Vitelline gland is compact, oval in shape, post-ovarian. Longitudinal excretory canals present on either side of the segment, long, tubular.

The genus *Cotugnia* was established by Diamare (1893), with its type species *C.diagnopora* (Pasquale,1890), subsequently following thirty seven species are known so far viz., *C.digonopora* (Pasquale, 1890) Diamare, 1893; *C.polyacantha* Fuhrmann, 1909; *C.cuneatea tenuis* Meggitt, 1924; *C.joyeuxi* Baer, 1925; *C.parva* Baer, 1925; *C.fleari* Meggitt, 1927; *C.bahli* Johri, 1934; *C.intermedia* Johri, 1934; *C. noctua* Johri, 1934; *C.taiwanensis*, Yamaguti, 1935; *C.rimandoi* Tubanguai *et al.* Masilungam, 1937; *C.magna* Burt, 1940; *C.aurangabadensis* Shinde, 1969; *C.columbae*, Shinde 1969; *C.srivastavi* Malviya and Datta, 1970; *C.magdoubii* Magzoubi and Kasim, 1980; *C.satpulensis* Malhotra and Capoor, 1983; *C. yamagutii* Shinde, 1985; *C. vishakhapatnamensis* Kolluri, 1988; *C.rajivji* Jadhav *et al.*, 1994; *C. kamatensis* Kharade and Shinde, 1995; *C.chengmaii* C. Wongsawad and Jadhav, 1988; *C.manishae* Shinde, 1999; *C. ganguae* Shinde, 1999, *C.mehdii* Mahajan *et al.*, 1999, *C.alii* Shinde *et al.*, 2002; *C. sillodensis* Jadhav *et al.*, 2004; *C.singhi* Pawar *et al.*, 2004; *C. lohaensis* Jadhav *et al.*, 2004; *C.shankari* Tat and Jadhav 2005; *C. liviae* Patil *et al.*, 2005; *C.streptopelii* G.P. Jadhav *et al.*, 2009. *C. hafezzi* Nanware *et al.*, 2010 ; *C. indiana* Kasar *et al.*, 2010 ; *C.indiana minor* Garad *et al.*, 2010, *C. tetragona* Nanware *et al.*, 2011, *C.orientalis* Nanware *et al.* (2011).

The *Cotugnia diamarei* Sp. Nov. under discussion is

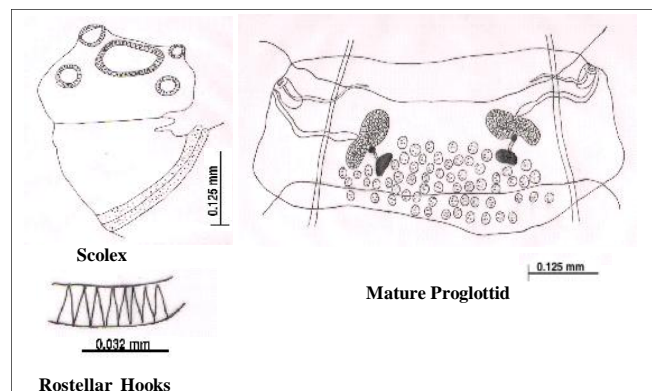


Fig. 1 :The chromosomes number of *Psoralea corylifolia* (2n=22)

Table 1: Comparative morphometric data of 38 avian tapeworm species of the genus *Cotugnia* known so far from the world including the present species viz., *Cotugnia diamarei* sp. Nov.

Tapeworm: <i>Cotugnia</i> species from avian host	Morphometric characteristics of avian tapeworm <i>Cotugnia</i> species known so far from the world										Host species
	Shape	Size (mm)	Shape	Rostellum Size (mm)	Hooks	Testes	Ovary	Cirrus pouch	Other organs		
<i>Cotugnia diamarei</i> sp. Nov.	Quadrangular	0.59-0.72 x 0.68-1.04	Oval, large, armed	0.21-0.25 x 0.39-0.46	53-55	63	Bilobed	0.283-C.289 x 0.03-0.09		<i>Gallus gallus domesticus</i>	
<i>C. digonopora</i> , Pasquale, 1890, Diamare 1893	Large	1.5 in diameter	Retractile, armed	0.15 in diameter	Numerous	100-150	--	0.30		Fowl	
<i>C. polyacantha</i> , Fuhrmann, 1909		0.45		0.22	420	100		0.180		<i>Columba turur</i>	
<i>C. cuneata</i> , Meggitt, 1924	Rounded	0.26	Rounded	0.12	400	50	--	--		<i>Columba livia</i>	
<i>C. joyauxi</i> Baer, 1925		0.67		0.19	250	30-50		0.075		<i>Turtur sengalensis</i>	
<i>C. parva</i> , Baer, 1925		0.49-0.68 x 0.69-0.85		0.15	378-396	32-41		0.196-0.106		<i>Columba livia</i>	
<i>C. fleari</i> , Meggitt, 1927		0.45-0.58				28-44		0.29-0.31		<i>Columba livia</i>	
<i>C. bahli</i> , Johri, 1934		0.50		0.34	332	69-74		0.215-0.223		<i>Gallus domesticus</i>	
<i>C. intermedia</i> , Johri, 1934		0.44-0.52				69-74		0.215-0.225		<i>Gallus intermedia</i>	
<i>C. noctua</i> , Johri, 1934		0.51		0.22		170-182		0.176-0.200		<i>Columba intermedia</i>	
<i>C. titaniumensis</i> , Yamaguti, 1935		0.54-0.74		0.44	260	12-13				<i>Columba livia</i>	
<i>C. rimondi</i> , Tubangui and Masilungan, 1937					300	100-136				<i>Columba livia</i>	
<i>C. magna</i> , Burt, 1940		0.58-0.62		0.28-0.31	480-500	150		0.238-0.270		<i>Columba livia</i>	
<i>C. aurangabadensis</i> , Shinde, 1969	Broad	0.48	Flat	0.300	500, in two rows	80-90	Compact	1.30 1.04		<i>Columba livia</i>	
<i>C. columbae</i> , Shinde, 1969	Wide	0.54-0.74		0.447	1200	12-14	Bilobed	0.3		<i>Columba livia</i>	
<i>C. srivastavi</i> , Malviya and Dutta, 1970		0.72		0.446		80-85				<i>Columba livia</i>	
<i>C. magdoubii</i> , Magzoubi and Kasim, 1980		0.44-0.55		0.25-0.44				0.15-0.18		<i>Columba livia</i>	
<i>C. sapulensis</i> , Malhotra and Kapoor, 1983	Small	0.555		0.230	(337)248-384	43-52	Bilobed	0.190-0.283		<i>Columba livia domestica</i> and <i>Columba livia intermedia</i>	
<i>C. yamagutii</i> , Shinde <i>et al.</i> , 1985	Globular	0.51-0.60	Rounded	0.26-0.27	500	190-200	Bilobed	0.005-C.132 x 0.044-0.197		<i>Columba livia</i>	
<i>C. wishakhapatnamensis</i> Kalluri, R. Laxmi and Rao, 1988		28-3 x 0.336-1.056									

Contd... Table 1

Table 1 Contd.....

<i>C. rajnji</i> , Jadhav <i>et al.</i> , 1994	Oval	0.62-1.006	0.37-0.44	350-400	60-65	Bilobed	0.280-0.282	<i>Gallus gallus domesticus</i>
<i>C. kamatiensis</i> , Klarade and Shinde, 1995	Squarish	0.84-1.00 x 0.917-1.099	0.068 x 0.152	200-210	95-105	Bilobed	0.05-0.06	<i>Gallus gallus domesticus</i>
<i>C. chengnai</i> , C. Wongsawad and Jadhav, 1998	Quadrangular	0.58 x 0.738	0.194 x 0.249	Numerous	30-35	Bilobed	0.32 x 0.043	<i>Gallus gallus domesticus</i>
<i>C. manishae</i> , Shinde <i>et al.</i> , 1999		0.462 x 0.485	0.220 x 0.227	110-120	85-90	Oval	0.083-0.121 x 0.030-0.038	<i>Columba livia</i>
<i>C. ganguae</i> , Shinde <i>et al.</i> , 1999	Squarish	0.529 x 0.636	0.189 x 0.216	275-300	135-150	Bilobed	0.260	<i>Corvus splendens</i>
<i>C. meidii</i> , Malajar <i>et al.</i> , 1999		0.985 x 1.516	0.129 x 0.182	110	140-150	--	0.530	<i>Gallus domesticus</i>
<i>C. alii</i> , Shinde <i>et al.</i> , 2002	--	0.450-0.456 x 0.639-0.657	0.279 x 0.436-0.315	100-110	80-85	--	0.241-0.191 x 0.029-0.024	<i>Columba livia</i>
<i>C. silodensis</i> , Jadhav <i>et al.</i> , 2003	Quadrangular	0.851-1.192 x 1.192-1.395	0.170-0.281	220-250	--	Irregular	0.067-0.092 x 0.035	<i>Gallus domesticus</i>
<i>C. singhi</i> , Pawar <i>et al.</i> , 2004		0.363 x 0.436	0.154 x 0.255	200-210	65-70	Bilobed, H shaped	0.229 x 0.159	<i>Columba livia</i>
<i>C. lohaensis</i> , Jadhav <i>et al.</i> , 2004	Oval	0.590-0.660 x 0.741-0.757	0.227 x 0.242	190-210	28-30	Bilobed	0.086-0.097 x 0.004-0.009	<i>Columba livia</i>
<i>C. shankari</i> , Tet and Jadhav, 2005	Quadrangular	0.947-1.000 x 0.955-1.175	0.049-0.92 x 0.182-0.213	105-205	27-40	Bilobed	0.098 x 0.030	<i>Columba livia</i>
<i>C. liviae</i> , Patil <i>et al.</i> , 2005	Oval	0.369 x 0.359	0.175 x 0.097	250-270	120-125		0.225 x 0.068	<i>Columba livia</i>
<i>C. streptopelia</i> , G.P. Jadhav, <i>et al.</i> , 2009	Quadrangular	8.04 x 9.82	2.58 x 1.96	Numerous	27-30	Bilobed	0.89 x 0.71	<i>Streptopelia decacoto</i>
<i>C. hafezi</i> , Nanware <i>et al.</i> , 2010	Quadrangular	1.245 x 1.086	0.317 x 0.392	55-60	130-150	Butterfly shaped	0.23 x 0.11	<i>Gallus gallus domesticus</i>
<i>C. indiana</i> , Kasar <i>et al.</i> , 2010	Squarish	0.584 x 0.548	0.196 x 0.230	100-120	1.5-120	Bilobed	0.189 x 0.079	<i>Columba livia</i>
<i>C. indiana minor</i> , Garad <i>et al.</i> , 2010	Squarish	0.606 x 0.681	0.265 x 0.492	400-415	70-75	Bilobed	0.072 x 0.029	<i>Columba livia</i>
<i>C. tetragona</i> , Nanware <i>et al.</i> , 2011	Tetragonal	0.927 x 0.773	0.280 x 0.450	120-130	60-70	Bilobed	0.185 x 0.090	<i>Columba livia</i>
<i>C. orientalis</i> , Nanware <i>et al.</i> , 2011	Oval Quadrangular	1.26 x 0.92	0.22 x 0.63	115-125	45-50	Bilobed, W shaped	0.168 x 0.128	<i>Gallus gallus domesticus</i>

characterized by having to scolex large, oval, suckers four, oval to rounded, arranged in four corners, rostellum oval, large, placed in anterior region of scolex and having rostellar ring, rostellar hooks 53-55 in numbers, 'V' shaped, arranged in a single circle, neck short, mature proglottids three times broader than long, testes 62 in numbers, oval to rounded, postovarian, cirrus pouch cylindrical, cirrus short, curved tube contained within cirrus pouch, vas deferens thin, curved, vagina posterior to cirrus pouch, and ovary bilobed.

- The present form comes closer to all reported above mentioned species in general topography of organs, but differs from *C.digonopora* Pasquale 1890, Diamare, 1893 in the size of scolex (0.59 -0.72 x 0.68-1.04 mm Vs 1.5), size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 1.5, rostellar hooks (53-55Vs numerous), number of testes (62 in number Vs 100-150) and size of cirrus pouch (0.283-0.289 x 0.03-0.09 mm Vs 0.300).
- The *Cotugnia diamarei* Sp. Nov. differs from *C.polyacantha* Fuhrmann, 1909, in having size of scolex (0.59 -0.72 x 0.68-1.04 mm Vs 0.45), size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.22), number of rostellar hooks (53-55 Vs 420), number of testes 62 Vs 100), size of cirrus pouch (0.283-0.289 x 0.03-0.09 mm Vs 0.180) and reported from intestine of *Gallus gallus domesticus* Vs *Columba livia*.
- The present specimen differs from *C.cuneata* tenuis Meggitt, 1924 due to shape and size of scolex (oval, 0.59 -0.72 x 0.68-1.04 mm Vs rounded, 0.26), rostellum (0.21-0.25 x 0.39-0.46 mm Vs rostellum rounded, 0.12) and reported from *Gallus gallus domesticus* Vs *Columba livia*
- The *Cotugnia diamarei* Sp. Nov. differs from *C.joyeuxi* Baer, 1925; by having Size of scolex (0.59 -0.72 x 0.68-1.04 mm Vs 0.67); size of rostellum (0.21-0.25 x 0.39-0.46 mm Vs 0.19); number of rostellar hooks (53-55 in number Vs 250); number of testes (62 Vs 30-50); size of cirrus pouch (0.283-0.289 x 0.03-0.09 Vs 0.075).
- It differs from *C. parva* Baer, 1925, due to size of scolex (0.59 -0.72 x 0.68-1.04 mm Vs. 0.49-0.68x 0.69-0.85 mm). Size of rostellum 0.21-0.25 x 0.39-0.46 mm where as 0.15); rostellar hooks (53-55 where as 378-396), Testes (62in number where as 32-41 in numbers), size of cirrus pouch (0.283-0.289 x 0.03-0.09 Vs 0.196-0.106) and reported from *Gallus gallus domesticus* Vs *Columba livia*.
- The present form differs from *C.fleari* Meggitt, 1927, in having size of scolex (0.59 -0.72 x 0.68-1.04 mm Vs 0.45-0.58), testes (62 Vs 28-44), size of cirrus pouch 0.283-0.289 x 0.03-0.09mm Vs 0.29-0.31 mm and reported from *Gallus gallus domesticus* Vs *Columba livia*
- The *Cotugnia diamarei* Sp. Nov. differs from *C.bhali* Johri, 1934 due to size of scolex 0.59 -0.72 x 0.68-1.04 mm Vs 0.50, size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.34, number of rostellar hooks 53-55 Vs 332; Testes 62 Vs 69-74 in number; size of cirrus pouch 0.283-0.289 x 0.03-0.09 mm Vs 0.215-0.223.
- It differs from *C.intermedia* Johri, 1934 in having size of scolex (0.59 -0.72 x 0.68-1.04 mm Vs 0.44-0.525 mm), number of testes (62 Vs 69-74); size of cirrus pouch (0.283-0.289 x 0.03-0.09mm Vs 0.215-0.225).
- The present form differs from *C.noctua* Johri, 1934 by having size of scolex 0.59 -0.72 x 0.68-1.04 mm Vs 0.51, size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.225, number of testes 62 Vs 170-182, size of cirrus pouch 0.283-0.289 x 0.03-0.09mm Vs 0.176-0.200.
- The present form differs from *C.taiwanensis* Yamaguti, 1935 due to size of scolex 0.59 -0.72 x 0.68-1.04 mm Vs 0.54-0.74 mm, The size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.44, number of rostellar hooks (53-55 Vs 200), number of testes (62 Vs 12-13) and reported from *Gallus gallus domesticus* Vs *Columba livia*.
- The *Cotugnia diamarei* Sp. Nov. differs from *C.rimandoi* Tubangui et Masilungam, 1937 in number of rostellar hooks (53-55 against 300), number of testes (62 against 100-136) and described from *Gallus gallus domesticus* Vs *Columba livia*.
- The new form differs from *C.magna* Burt, 1940, in having size of scolex (0.59 -0.72 x 0.68-1.04 mm against 0.58-0.62); size of rostellum (0.21-0.25 x 0.39-0.46 mm against 0.285-0.315), number of rostellar hooks (53-55 against 480-500); number of testes (62 against 150); size of cirrus pouch (0.283-0.289 x 0.03-0.09 mm against 0.238-0.270) and reported from *Gallus gallus domesticus* Vs *Columba livia*.
- The present tapeworms differs from *C.aurangabaensis* Shinde 1969, in having shape and size of scolex (Oval, 0.59 -0.72 x 0.68-1.04 mm Vs Broad, 0.483 mm) rostellum large, oval, placed in centre of scolex, 0.21-0.25 x 0.39-0.46 mm against flat, 0.300 mm, number of rostellar hooks (53-55 against 500), testes oval to rounded, 62 against small rounded, 80-90, cirrus pouch elongated, 0.283-0.289 x 0.03-0.09 against slender, 1.30 x 1.040 mm in length and breadth, ovary bilobed against compact and reported from *Gallus gallus domesticus* Vs *Columba livia*.
- The *Cotugnia diamarei* Sp. Nov. differs from *C.columbae* Shinde, 1969, due to shape and size of scolex (oval, 0.59 -0.72 x 0.68-1.04 mm Vs wide, 0.54-0.74 mm), size of rostellum (0.21-0.25 x 0.39-0.46 mm Vs 0.447), number of rostellar hooks (53-55 Vs 1200), number of testes (62 Vs 12-14), shape and size of cirrus pouch (elongated, 0.283-0.289 x 0.03-0.09 Vs narrow, short, 0.3), vitelline gland (compact, large Vs absent) and reported from *Gallus gallus domesticus* Vs *Columba livia*.
- The present specimen differs from *C.srivastavi* Malviya and Dutta, 1970, in having size of scolex (0.59 -0.72 x

- 0.68-1.04 mm Vs 0.726), size of rostellum (0.21-0.25 x 0.39-0.46 mm Vs 0.446), number of testes (62 Vs 80-85) and reported from *Gallus gallus domesticus* Vs *Columba livia*.
- It differs from *C. magdoubii*, Magzoubi and Kasim, 1980, in having size of scolex (0.59-0.72 x 0.68-1.04 mm) Vs (0.44-0.55); size of rostellum (0.21-0.25 x 0.39-0.46 mm Vs 0.25-0.44); size of cirrus pouch (0.283-0.289 x 0.03-0.09 Vs 0.15-0.18) and reported from the intestine of *Gallus gallus domesticus* Vs *Columba livia*.
 - The present form differs from *C. satpulensis* Malhotra and Kapoor, 1983, in having size of scolex (0.59-0.72 x 0.68-1.04 mm Vs 0.535), size of rostellum (0.21-0.25 x 0.39-0.46 mm Vs 0.230), number of rostellar hooks (53-55 Vs 337), number of testes (62 Vs 43-52), size of cirrus pouch (0.283-0.289 x 0.03-0.09 mm Vs 0.190-0.283 mm) and reported from *Gallus gallus domesticus* Vs *Columba livia*.
 - The *Cotugnia diamarei* Sp. Nov. differs from *C. yamagutii* Shinde *et al.*, 1985 in having shape and size of scolex oval, (0.59-0.72 x 0.68-1.04 mm Vs 0.51-0.60 mm), rostellum large, oval, 0.21-0.25 x 0.39-0.46 mm Vs rounded, 0.26-0.27, number of rostellar hooks (53-55 Vs 500), number of testes (62 Vs 190-200), size of cirrus pouch (0.283-0.289 x 0.03-0.09 mm as against 0.005-0.132 x 0.044-0.0197 mm in length and breadth) and reported from *Gallus gallus domesticus* Vs *Columba livia*.
 - The present worm differs from *C. vishakhapatnamensis* Kolluri 1988, by having size of scolex oval, 0.59-0.72 x 0.68-1.04 mm Vs 28-35 x 0.336-1.056.
 - The present cestode differs from *C. rajivji* Jadhav *et al.*, 1994, in having shape and size of scolex (oval, 0.59-0.72 x 0.68-1.04 mm Vs oval, 0.62-1.006), size of rostellum (0.21-0.25 x 0.39-0.46 mm) Vs (0.37-0.44 mm), number of rostellar hooks (53-55 Vs 350-400), number of testes (62 Vs 60-65), size of cirrus pouch (0.283-0.289 x 0.03-0.09 mm Vs 0.280-0.282).
 - The *Cotugnia diamarei* Sp. Nov. differs from *C. kamatensis* Kharade and Shinde, 1995, by having shape and size of scolex oval, (0.59-0.72 x 0.68-1.04 mm Vs squarish, 0.84-1.00 x 0.917-1.099), shape and size of rostellum large, 0.21-0.25 x 0.39-0.46 mm Vs small, 0.018 x 0.152 mm, number of rostellar hooks (53-55 Vs 200-210); number of testes (62 Vs 95-105); shape and size of cirrus pouch medium, elongated, 0.283-0.289 x 0.03-0.09 as against oval, cylindrical, 0.005-0.60 mm), vagina posterior to cirrus pouch against anterior to cirrus pouch.
 - The present tapeworm differs from *C. chengmai* C. Wangsawad *et al.*, 1998, by having size of scolex (0.59-0.72 x 0.68-1.04 mm Vs 0.58 x 0.738), size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.194 x 0.249 mm, number of testes (62 Vs 30-35), size of cirrus pouch (0.283-0.289 x 0.03-0.09 Vs 0.32 x 0.043).
 - The *Cotugnia diamarei* Sp. Nov. differs from *C. manishae* Shinde *et al.*, 1999, in having size of scolex 0.59-0.72 x 0.68-1.04 mm Vs 0.485, size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.22 x 0.227 mm, number of hooks (53-55 Vs 110-120), number of testes (62 Vs 85-90) size of cirrus pouch (0.283-0.289 x 0.03-0.09) Vs (0.083-0.121 x 0.030-0.038), vitelline gland compact, large Vs oval to triangular and collected from *Gallus gallus domesticus* Vs *Columba livia*.
 - The present worm differs from *C. ganguae* Shinde *et al.*, 1999, in having size of scolex 0.59-0.72 x 0.68-1.04 mm Vs 0.529 x 0.636, size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.189 x 0.216 mm, number of rostellar hooks (53-55 Vs 275-300), number of testes (62 Vs 155-160), Size of cirrus pouch (0.283-0.289 x 0.03-0.09) mm Vs 0.260 mm in length and reported from *Gallus gallus domesticus* Vs *Corvus splendens*.
 - The *Cotugnia diamarei* Sp. Nov. differs from *C. mehdii* Mahajan *et al.*, 1999, due to size of scolex (0.59-0.72 x 0.68-1.04 mm Vs 0.985 x 1.516), size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.129 x 0.182 mm, number of hooks (53-55 Vs 110), number of testes (62 Vs 140-150); size of cirrus pouch 0.283-0.289 x 0.03-0.09 Vs 0.530.
 - The present tapeworm differs from *C. alii*, Shinde *et al.*, 2002, in having size of scolex 0.59-0.72 x 0.68-1.04 mm as against 0.450-0.436 x 0.639-0.657, size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.279 x 0.436-0.315 mm, number of rostellar hooks (53-55 as against 100-110), number of testes (62 as against 80-85), size of cirrus pouch (0.283-0.289 x 0.03-0.09 as against 0.241-0.191 x 0.029-0.024) and reported from *Gallus gallus domesticus* Vs *Columba livia*.
 - The *Cotugnia diamarei* Sp. Nov. differs from *C. sillodensis* Jadhav *et al.*, 2003, in having size of scolex (0.59-0.72 x 0.68-1.04 mm Vs 0.851-1.192 x 1.192-1.395), size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.170 x 0.281); number of hooks (53-55 Vs 220-250), size of cirrus pouch 0.283-0.289 x 0.03-0.09 Vs 0.067-0.092 x 0.035.
 - The present worm differs from *C. singhi* Pawar S.B. *et al.*, 2004, by having size of scolex (0.59-0.72 x 0.68-1.04 mm Vs 0.363 x 0.436-0.417), size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.154 x 0.255-0.215 mm, number of rostellar hooks (53-55 Vs 200-210), number of testes (62 Vs 65-70), size of cirrus pouch 0.283-0.289 x 0.03-0.09 Vs 0.229-0.159 x 0.033-0.024.
 - The present worm differs from *C. lohaensis*, Jadhav *et al.*, 2004 by having size of scolex (0.59-0.72 x 0.68-1.04 mm Vs 0.590-0.660 x 0.471-0.757), size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.227 x 0.242 mm, number of hooks (53-55 Vs 190-210), number of testes (62 Vs 28-30), size of cirrus pouch (0.283-0.289 x 0.03-0.09) Vs (0.086-0.097 x

- 0.004-0.009) and reported from *Gallus gallus domesticus* Vs *Columba livia*.
- The *Cotugnia diamarei* Sp. Nov. differs from *C.shankari* Tat and Jadhav, 2005, by having size of scolex (0.59 -0.72 x 0.68-1.04 mm Vs 0.947-1.000 x 0.955-1.175), size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.049-0.092 x 0.182-0.213 mm, number of hooks(53-55 Vs 105-205), number of testes (62 Vs 27-40), size of cirrus pouch 0.283-0.289 x 0.03-0.09 Vs 0.098-0.030 and reported from *Gallus gallus domesticus* Vs *Columba livia*.
 - The present cestode differs from *C.liviae* Patil *et al.*, 2005, in having size of scolex 0.59 -0.72 x 0.68-1.04 mm Vs 0.369 x 0.359-0.437 mm, size of rostellum 0.21-0.25 x 0.39-0.46 mm Vs 0.175-0.0189 x 0.097-0.131 mm, number of hooks (53-55 Vs 250-270), number of testes 62 Vs 120-125(123) and size of cirrus pouch (0.283-0.289 x 0.03-0.09 Vs 0.225 x 0.068) and reported from the intestine of *Gallus gallus domesticus* Vs *Columba livia*.
 - It differs from *C. streptopelli* G.P. Jadhav *et al.*, 2009, by having size of scolex (0.59 -0.72 x 0.68-1.04 mm as against 8.04-5.36 x 9.82-5.36), number of testes (62 as against 27-30), size of ovary (0.12 x 0.37 Vs 5.36-4.46 x 5.34-4.46).
 - The *Cotugnia diamarei* Sp.Nov. differs from the *Cotugnia hafezzi* Nanware *et al.*,2010 in having size of scolex 0.59 -0.72 x 0.68-1.04 mm Vs quadrangular 1.245 x 1.086, number of rostellar hooks (53-55 Vs 55-60), number of testes (62 Vs 150-160), size of cirrus pouch (0.283-0.289 x 0.03-0.09 Vs 0.23 x 0.11).
 - The present form differs from *Cotugnia indiana* Kasar *et al.*, 2010 in having size of scolex 0.59 -0.72 x 0.68-1.04 mm Vs squarish, 0.58 x 0.54, number of rostellar hooks (53-55 Vs 100-120), number of testes (62 Vs 115-120), size of cirrus pouch (0.283-0.289 x 0.03-0.09 Vs 0.189 x 0.0.079) and reported from *Gallus gallus domesticus* Vs *Columba livia*.
 - The présent cestode differs from *C.indiana minor* Garad *et al.*, 2010 in having scolex 0.59 -0.72 x 0.68-1.04 mm Vs squarish, rostellar hooks (53-55 Vs 400-415) in numbers, testes(62 Vs 70-75) in numbers.
 - It differs from the *Cotugnia tetragona* Nanware *et al.*,2011 in having size of scolex 0.59 -0.72 x 0.68-1.04 mm Vs tetragonal, large 0.927 x 0.773, number of Rostellar hooks (53-55 Vs 120-130), number of testes (62 Vs 60-70), size of cirrus pouch (0.283-0.289 x 0.03-0.09 Vs 0.185 x 0.090) and reported from *Gallus gallus domesticus* Vs *Columba livia*.
 - The *Cotugnia diamarei* Sp.Nov. differs from *Cotugnia orientalis* Nanware *et al.*,2011 in having size of scolex 0.59 -0.72 x 0.68-1.04 mm Vs 1.266 (1.102-1.431) x 0.927 (0.901-0.954), number of rostellar hooks (53-55 Vs 110-120), number of testes (62 Vs 45-50) and size of cirrus pouch (0.283-0.289 x 0.03-0.09 Vs 0.168 x 0.128).
- Toxonomic summary:**
- | | |
|----------------------|---------------------------------------------------------------------------------------------------------|
| Type species | : <i>Cotugnia diamarei</i> sp.Nov. |
| Host | : <i>Gallus gallus domesticus</i> ,
Linnaeus, 1758 |
| Habitat | : Intestine |
| Locality | : Nanded (M.S.) India. |
| Prevalence | : Eleven specimens collected
from five infected host out of
Eight examined. |
| Period of collection | : March, 2011-May, 2011. |
| No. of Specimen | : 11 |
| Accession number | : PGDZ/YMN/1-02/ March,
2012-May,2012 |
| Deposition | : Research and P.G. Department
of Zoology, Yeshwant
Mahavidyalaya, Nanded. |
| Etymology | : The species is named in
honour of Diamare for his
valuable contributions made
in this field. |
- Conclusion:**
- From the above discussion it is clear that, the species under discussion is new to science and differs from known valid species of the genus *Cotugnia* in respect to taxonomic characteristics. On the basis of presence of above mentioned differences and variations the authors are convinced to place the present form in new species viz., *Cotugnia diamarei* Sp.Nov. in honour of Diamare for his valuable contributions made in this field.
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