First Record of Two Species of *Cobbonchus* Andrassy, 1958 (Nematoda: Cobbonchidae) from South Kalimantan

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Abstract: For several decades soil nematode community structure has been used as bioindicator of soil conditions. Because the accuracy of the assessment necessitates proper identification of existing taxa, the potential use of nematode as bioindicator can only be realized in places where most soil nematode species have been well identified. Previous surveys of soil nematodes in South Kalimantan (Borneo) left some specimens that were identified as belonging to the genus *Cobbonchus* Andrassy, 1958, but the species was unknown. In the present study, as a part of the South Kalimantan Nematode Biodiversity Project, the specimens were further examined and identified as *Cobbonchus collaris* Andrassy, 1985 and *Cobbonchus indicus* Baqri, Baqri & Jairajpuri, 1978. Despite some differences, morphological characters of the South Kalimantan specimens generally conformed the previously published descriptions of the species. The deviations were considered intraspecific variations that may lead to redescriptions of the corresponding species. This is the first record of occurrence of the two species in South Kalimantan that provides new data on the geographic distribution of the genus and species.

1 INTRODUCTION

Nematodes, in addition to prokaryotes, are the major components of biodiversity in soil ecosystems. Not only nematodes are the most abundant metazoans in soils (Sohlenius, 1980; Bongers and Bongers, 1998), nematode community is also characterized by a high species diversity (Yeates, 1979) that most trophic levels of the soil food web are occupied by nematodes (Yeates *et al.*, 1993). Therefore, nematode diversity is indicative of general biodiversity in the soil (Yeates and Bongers, 1999).

It has been shown that nematodes play crucial roles in fundamental ecological processes in soils and therefore they are correlated with soil functional parameters and reflects soil functioning (Bongers and Bongers, 1998; Ekschmitt *et al.*, 2001; Hodda, Peters and Traunspurger, 2009). This is the basis for the using of nematode community structure as bioindicator of soil ecological condition (Bongers, 1990).

Although in general the using of nematodes as bioindicator of soil condition does not require identification to species level (Bhusal *et al.*, 2014), more information would be obtained with species-level discrimination (Ferris and Bongers, 2009). Species-level identification is also necessary to further understand the role of nematodes in soil processes and thus in ecosystem resilience (Yeates, 2003). In regions where the nematofauna has not been explored, such as South Kalimantan (Borneo), inventory of soil nematodes is a prerequisite for the using of nematodes as bioindicators. Therefore, attempts should be made to reach species-level identification.

In most soils mononchids comprise important component of the nematode communities. The predatory nematodes can be found in all kind of soils, and in much greater number in undisturbed soils (Ahmad and Jairajpuri, 2010).

Specimens of mononchids were collected during a nematode ecology survey held in South Kalimantan in 2005. The specimens were deposited in the Nematode Collection of the Laboratory of Biosystematics, Faculty of Mathematics and Natural Sciences, Lambung Mangkurat University. These were identified as belong to the genus *Cobbonchus* Andrassy, 1958. However, the identification was not continued to species.

In the present study the mononchid specimens were further examined and described herein as *Cobbonchus collaris* Andrassy, 1985 and

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Cobbonchus indicus Baqri, Baqri & Jairajpuri, 1978. These are the first record of existence of the two species in South Kalimantan, and presumably in the Island of Kalimantan (Borneo) or even in Indonesia.

2 MATERIALS AND METHODS

In the 2005 survey specimens of mononchid nematodes were collected by the author from Gambut Subdistrict, Banjar District, South Kalimantan.

The nematodes were killed and fixed in hot 4% formalin and were transferred to pure glycerine using rapid method of Seinhorst (1959). The specimens were then mounted in Cobb double coverslip slides.

Morphology of the specimens were examined under a compound microscope (Nikon E100). A mirrorless camera was attached to the eyepiece and connected to a laptop. Measurements were taken using Camera Measure Version 2.1.3.250 software (© e2eSoft) that has been calibrated by an ocular micrometer.

3 RESULTS AND DISCUSSION

3.1 *Cobbonchus collaris* Andrassy, 1985

3.1.1 Female (Fig. 1)

Measurements: see table 1.

Body slender, ventrally arcuate after fixation, posterior part more curved than anterior. Cuticle smooth. Lip region not offset from the rest of the body, 24 µm wide. Buccal cavity thick-walled with a narrow base, 36x15 µm, 1.5 times longer than cephalic diameter. Stoma formed with three teeth of nearly equal size. Dorsal tooth medium, located in anterior half of buccal cavity; its pointed apex at 71% of buccal cavity length from base. Two subventral teeth in posterior half of buccal cavity, anteriorly directed apexes at 45% of buccal cavity length from base. Pharynx cylindroid, muscular, 26% of body length. Excretory pore indistinct. Pharyngointestinal junction non-tuberculate.

Genital system amphidelphic, anterior and posterior branch equal in length. Vulva slightly posterior to mid body, lips not protruding. Vagina 13 µm, about 1/3 of corresponding body width. Distance vulva-anus 8.5 times longer than tail. Rectum 19 µm, shorter than anal body width. Tail short 23 µm, about 2.2 anal body width long, uniformly tapering, with well developed caudal glands arranged in tandem and terminal opening.

Table 1: Morphometrics of Cobbonchus collaris from South Kalimantan.

Characters	*C. collaris* (n=1)
Body length (L)	1305
Max. body width (BW)	38.2
Lip region length	8.0
Lip region width	23.6
Buccal cavity length	36.5
Buccal cavity width	15.0
Dorsal tooth apex as % of buccal cavity length from base	71.2
Subventral teeth apices as % of buccal cavity length from base	44.9
Pharynx length	346.9
Tail length (T)	56.9
Rectum length	19.5
Anal body width (ABW)	26.2
a (L/BW)	34.2
b (L/distance anterior to	3.4
c (L/T)	22.9
c' (T/ABW)	2.2
V (L/distance anterior to vulva in %)	58.6
%Pharynx/L	26.6
Rectum/ABW	0.7

All measurements are in µm.

3.1.2 Male

Male not found.

3.1.3 Locality and Habitat

Specimens were recovered from a peatland covered by ferns and *Malaleuca leucadendra* in Gambut Subdistrict, Banjar District, the Province of South Kalimantan, Indonesia.

3.1.4 Remarks

The examined specimen of *Cobbonchus* from South Kalimantan population fits well the description of *Cobbonchus collaris* by Andrassy (1985), except in shorter body length (1.3 mm versus 1.6 mm), more posterior dorsal tooth apex (29% versus 22% of buccal cavity), shorter oesophagus relative to body length (27% versus 29-30%), shorter rectum relative to anal body width (70% versus 100%), relative length of anterior to posterior branch of female gonads (equal versus posterior shorter).

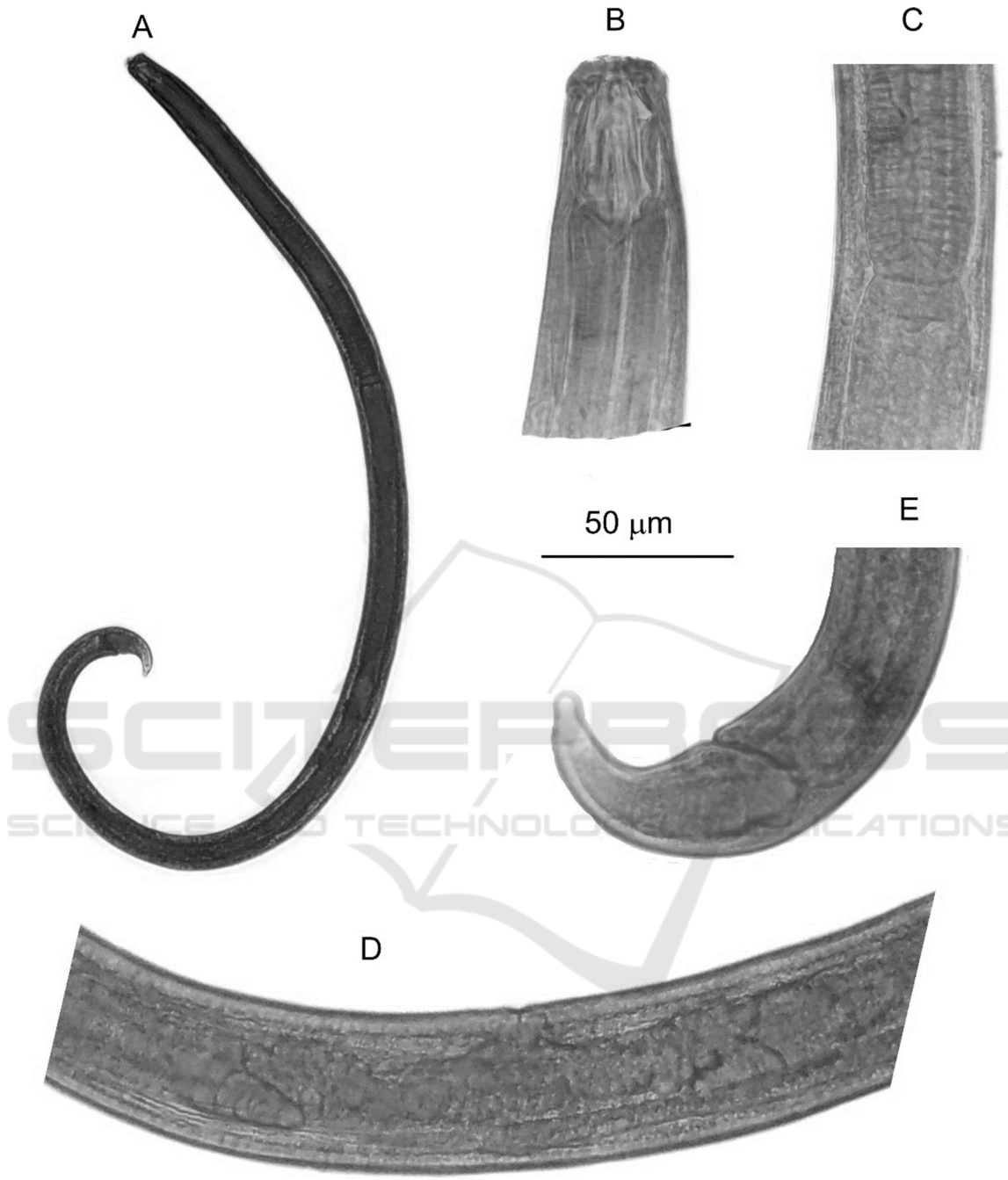

Figure 1: *Cobbonchus collaris* female from South Kalimantan. A. Whole body; B. Head; C. Pharyngo-intestinal junction; D. Gonad; E. Tail. Scale bar applies to B-E.

On the other hand, it conforms the description of *C. macrampulla* by Orselli and Vinciguerra (2007) in body length, position of dorsal tooth apex, and rectum length relative to anal body width.

The uniformly narrowing tail agrees best with those of *C. collaris*, *C. macrampulla*, *C. palustris*, and *C. radiatus*. However, the examined specimen does not show the large, sclerotized ampulla at the end of the caudal glands typical of *C. macrampulla*, the rounded lip region of *C. palustris*, and the offset head of *C. radiatus*. Furthermore, the caudal glands of the examined specimen are larger than those of *C. radiatus*. However, comparison with *C. radiatus* can not be thoroughly made as the description of the species was based on a single young adult female (Clark, 1960) and it is considered species inquirenda (Andrássy, 1985). It is concluded that the examined specimen belongs to a population of *C. collaris* and the differences in some morphometrics are here considered intraspecific variations.

3.2 *Cobbonchus Indicus*, Baqri, Baqri and Jairajpuri, 1978

3.2.1 Female (Fig. 2)

Measurements: see table 2.

Body slender, posterior half strongly curved ventrally after fixation. Head offset. Amphids cup-shaped, with slit-like apertures close to anterior end of stoma. Buccal cavity 26x11, anterior end arching inwards, posterior end somewhat pointed. Dorsal tooth apex at circa 18 um or 67% from base of stoma; subventral teeth smaller than dorsal, their apices at about 9 um or 35% from base of stoma. Oesophago-intestinal junction non-tuberculate. Excretory pore indistinct.

Reproductive system amphidelphic. Vulva at posterior half of body, about two third of body length. Vagina sclerotized distally, extending inwards up to half of corresponding body width. Ovaries reflexed. Tail short conoid, rather bulbous, slightly ventrally curved, 0.8 anal body-width long. Rectum equal to or slightly longer than anal body width. Caudal glands well developed; opening subdorsal.

3.2.2 Male

Male not found.

3.2.3 Locality and Habitat

Specimens were collected from a peatland covered by ferns and *Malaleuca leucadendra* in Gambut Subdistrict, Banjar District, the Province of South Kalimantan, Indonesia.

3.2.4 Remarks

The specimens of *Cobbonchus* examined agree with general morphology of *Cobbonchus indicus* as described by Baqri *et al.* (1978), except in some morphometric details. The South Kalimantan specimens are slightly longer (body length 1.16-1.30 mm versus 1.07 mm). Dorsal tooth apex is more posterior (65-70% versus 78% from base of stoma). Tail is shorter (16-24 versus ca 30 µm), mainly because of the shorter finger-like projection.

Despite the differences, the specimens from South Kalimantan are considered to belong to a population of *Cobbonchus indicus*. This is a new record of existence of this species in South Kalimantan and Indonesia, and even outside the type locality in India.

Table 2: Morphometrics of Cobbonchus indicus from South Kalimantan.

Characters	*C. indicus* (n=3)
Body length (L)	1165 – 1360
Max. body width	30.5 – 41.3
Lip region length	3.7 – 4.7
Lip region width	17.8 – 20.7
Buccal cavity length	25.9 – 27.0
Buccal cavity width	10.5 – 12.6
Dorsal tooth apex as % of buccal cavity length from base	64.9 – 70.0
Subventral teeth apices as % of buccal cavity length from base	32.8 – 40.4
Pharynx length	324.9 – 354.4
Tail length (T)	17.5 – 21.9
Rectum length	20.9 – 29.8
Anal body width (ABW)	21.0 – 24.3
a (L/max body width)	32.9 – 38.2
b (	3.3 – 3.5
c	62.1 – 71.1
c’	0.8 – 0.9
V	65.4 – 67.4
%Pharynx/L	26.1 – 27.9
Rectum/ABW	1.0 – 1.2

All measurements are in µm.

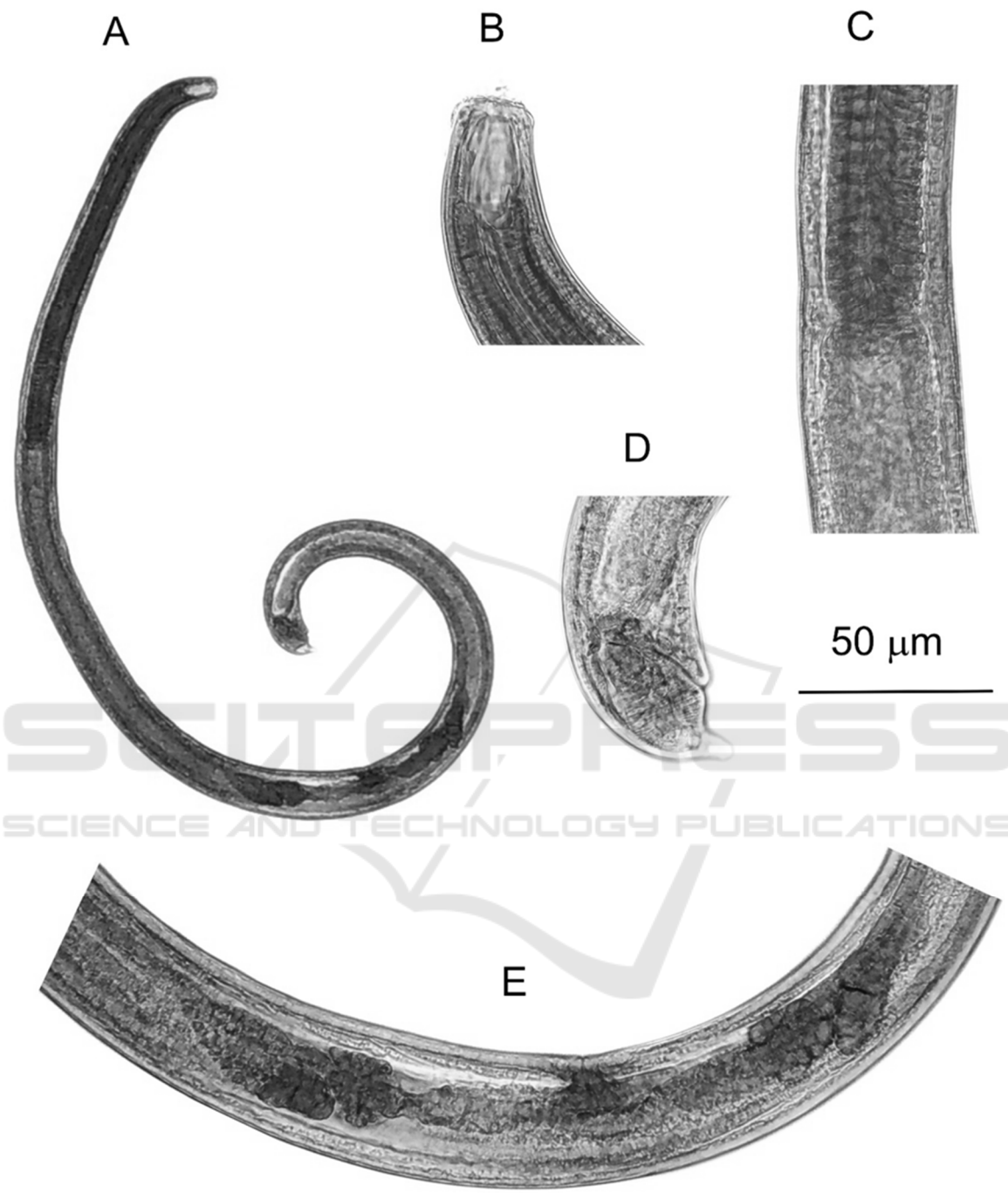

Figure 2: *Cobbonchus indicus* female from South Kalimantan. A. Whole body; B. Head; C. Pharyngo-intestinal junction; D. Tail; E. Gonad. Scale bar applies to B-E.

4 CONCLUSIONS

Specimens of *Cobbonchus* in the nematode collection of Laboratory of Biosystematics, Faculty of Mathematics and Natural Sciences, Lambung Mangkurat University have been identified as *Cobbonchus collaris* and *Cobbonchus indicus*. This is the first report of existence of the two species in South Kalimantan and in Indonesia.

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