

# ***Odontoponera denticulata* (F. Smith) (Formicidae: Ponerinae), a distinct species inhabiting disturbed areas**

Seiki YAMANE

Faculty of Science, Kagoshima University, Kagoshima-shi, 890-0065 Japan

## **山根 正気：攪乱地に生息するアレチカタツノハリアリ(新称) *Odontoponera denticulata* (F. Smith) について**

**要約** カタツノハリアリ属 *Odontoponera* にはいくつかの種、変種、亜種が記載されてきたが、Bolton (1995) はこれら全てを同一種 *Odontoponera transversa* (F. Smith) とみなした。それ以後、本属には1種のみが認められ今日に至っている。しかし、私は東南アジアにおけるフィールドでの観察とおし、状態の良い森林に生息するタイプと攪乱地に生息するタイプが存在することを見いだした。この2タイプはその後、形態によっても識別されることが分かった。1995年にこの問題を故 William Brown Jr.氏とメールで討論したが、氏は最終的には私の見解に同意された。しかし、氏が生前にこの結論を論文中で公表しなかったため、依然として「1種説」が流通している。本属の本格的なレビューを書くにはまだ材料が不足しているが、本属の種が普通種でありほとんどのインベントリで登場していることを考慮し、とりあえず両種の区別点を示しておきたいと思う。

両種は以下の形質によってほとんどの場合明確に区別できる(とくに断らない限り働きアリの形質について述べるが、たいていの場合女王にも適用可能である)。

- 1) 触角柄節の相対長。*Odontoponera transversa* (モリカタツノハリアリ, 新称) では触角柄節は比較的長く、頭部を正面から見た場合その先端は頭部後縁をはるかに越え、越える部分は触角第2節の長さかそれ以上である(時には触角末端節の長さに匹敵する)。一方、*O. denticulata* では触角柄節先端は頭部後縁をわずかに越えるのみで、越える部分の長さは通常触角第2節の長さ以下である。この形質は最も信頼が置ける。
- 2) 複眼の大きさ。*O. transversa* では複眼が小さく、複眼前縁と頬の前縁との間の距離は複眼の長径の 1.5-2 倍ある(検することのできた女王1個体では 1.45 倍)。一方、*O. denticulata* ではこの値は 1.2-1.4 の間である(検出することのできた数個体の女王ではおよそ 1.0)。
- 3) 頭頂近くの隆起部分の形状。頭頂近くの中央に半円形ないし逆三角形の隆起部があるが、この部分は *O. transversa* では非常に明瞭に区画されるが、*O. denticulata* では境界が明瞭でない。この形質は頭部の正面観でも確認できるが、側面から見た方がはっきりする。
- 4) 胸部(mesosoma)の隆起線の状態。*O. transversa* では胸部に走るかなり規則的な隆

起線が *O. denticulata* にくらべ細かく、隆起部も底も光沢がある。*O. denticulata* では隆起線はより粗く光沢がない。ただし、*O. transversa* でも状態の悪い標本では光沢が消えていることがあるので注意が必要である。

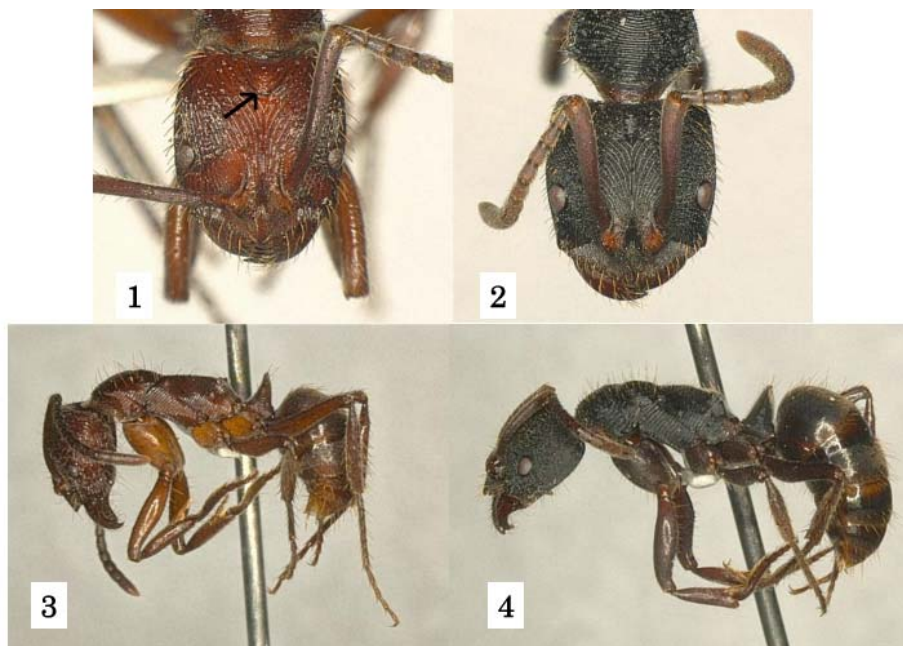
- 5) 腹柄節下部突起後方の毛。*O. transversa* では腹柄節下部突起後方にほとんど毛がないかあってもまばらであるが、*O. denticulata* では毛は長く密である傾向がある。
- 6) 前伸腹節背面から後面にかけての突起。この突起列は *O. transversa* では2個以下の小さな歯によって構成されるが、*O. denticulata* では通常3個のより大きい歯によって形成される。この形質は有用ではあるがいつも使えるとは限らない。
- 7) 体色。一般に *O. transversa* の体色は明るく、全身が赤味や褐色味を帯び脚は黄色であることが多い。一方、*O. denticulata* では全身が暗褐色で、赤味を帯びた脚をもつ。しかし、全身が暗褐色である *O. transversa* も稀に見られ、また *O. denticulata* の若い個体は体色が明るい。この形質だけで種を分けるのは危険である。

両種は 1), 2) の形質だけでたいてい容易に区別できる。それ以外の形質も使うと判定不可能な個体はほとんど存在しない。また、働きアリと女王アリは大半の形質を共有するので、女王アリの同定もほぼ確実にできる。両種は生息環境がかなり異なっており、*O. transversa* は潜在植生が熱帯雨林である地域の比較的よい林に生息し、*O. denticulata* は東南アジアー帯と南アジアに広範に分布し攪乱地や状態の悪い二次林に生息する。サラワクのランビルでは両種は林内とヘッドクォーターで奇麗に住み分けている。*O. transversa* の分布はほぼスダラント(スマトラ、ボルネオ、ジャワ、マレー半島南部、シンガポール)に限定される。

Creighton (1929) は本属についてのすぐれた論文を残しているが、その中で *O. transversa* とされているのは *O. denticulata* であり、彼が名付けた *O. transversa nitens* が真の *O. transversa* である。彼はいくつかの形質に着目し両者を正しく識別したが、おそらくタイプ標本を見ていなかったために、名称を正しく割り当てられなかったと思われる。ただ彼は最も重要な識別点(上述の 1), 2)) に気付かなかった。

## Introduction

The common ponerine '*Odontoponera transversa* (F. Smith)' spreads over Southeast Asia and are seen in most of local lists of ants in this area. Although several names have been proposed for different populations/sexes, Bolton (1995) recognized only one species, *O. transversa*, and other forms were treated as junior synonyms or subspecies. I have noticed during my fieldwork in Borneo that two biological species are included that can be constantly separated based on the morphology and habitat preference. In this preliminary paper I briefly discuss the taxonomic history of '*O. transversa*' and give important characteristics separating the two species. A revision of the genus will follow soon.



Figs. 1, 3. *Odontoponera transversa* (F. Smith), worker; 2, 4. *Odontoponera denticulata* (F. Smith), worker. 1, 2. Head in full-face view; 3, 4. Habitus in profile.

### Brief taxonomic history

The genus *Odontoponera* was erected by Mayr in 1862 for *Ponera denticulata* F. Smith. However, *Odontoponera denticulata* was synonymised with *O. transversa* (F. Smith) by Dalla Torre in 1893. This is the starting point of subsequent long-lasting confusion. The first serious treatment of the genus was made by Creighton (1929), who found some important characters to recognize varieties and subspecies, though unfortunately he succeeded Dalla Torre's mistake. Bolton (1995) follows this view. When I became aware of the presence of two biological species, one of them seemed to closely agree with Creighton's typical *O. transversa*, and the other with *O. transversa nitens* Creighton. I e-mailed Dr. William L. Brown Jr. to discuss this matter. After exchanging information between us he wrote to me in an e-mail: "I am inclined to think you are correct about the species distinctness of *nitens*, and I would even like to quote or paraphrase your remarks in my modification of this part of the ms." (11:46, 28 Sept. 1995). However, this paper might not have appeared before he passed away. As mentioned below, *O. denticulata* is actually a distinct species and agrees with Creighton's typical *O. transversa*, while *O. transversa nitens* should be a junior synonym of the true *O. transversa*. The mistake mentioned above occurred

probably because he did not examine the type materials of *Ponera transversa* and *P. denticulata* and simply followed Dalla Torre (1893). Smith (1858) himself did not compare these two probably because he seemed to believe that the latter originated from Africa (cf. Bolton, 1995).

### Redescription of the type materials

The following observation of a syntype of *Ponera transversa* and the type of *Ponera denticulata* made on 12th April, 2000 by me is incomplete and lacks measurements ordinarily used in the description of ants. However, some important recognition characteristics are given.

#### ***Ponera transversa* (worker)**

Labels from top: 1. Round, white, hand-written; upper side: '9/NC'; under side: '55' above, '9' below. 2. Rectangular, blue and hand-written: 'P. transversa'. 3. Rectangular, white and printed: 'Smith coll. pres. By Mrs. Farren White. 99-303'. 4. Round; larger one light blue; smaller one white: 'SYN. TYPE'.

Body 8.5 mm long. Head longer than broad (excluding mandibles), strongly striate longitudinally except on clypeus, which is more finely striate longitudinally in the central portion (lateral portion at least partly without striae). Anterior margin of clypeus distinctly denticulate. Mandible rather strongly shining, finely but distinctly striate, with 4 large teeth on the masticatory margin in addition to apical one; basal angle of masticatory margin with a small denticle; the teeth without sculpture, shining. Eye relatively small; its longest diameter much smaller than the shortest distance between anterior margin of eye and anterior margin of gena. Antennal scape relatively long; all the flagellar segments longer than broad; apical segment twice as long as broad. Vertex of head medially with a well-defined semicircular protuberance near posterior margin of head. Rugae on head slightly shining. Mesosoma almost wholly strongly rugose and somewhat shining. Rugae on pronotum concentric, but seen from above transverse. Rugae on mesonotum transverse; those on propodeum also transverse and extended to the sides. Neck of pronotum not striate. Striae on posterior face of propodeum much finer. Dorsolateral edges of propodeum weakly carinate; upper portion of each edge with two small processes. Petiole narrow and high, apically distinctly incised medially; its anterior face only microsculptured, with weak luster; lateral and posterior faces distinctly and transversely striate; subpetiolar process high and almost rectangular; its posterior corner almost right-angled in profile. Gastral tergites and sternites micropunctate and weakly shining. Body relatively sparsely with long and strong yellowish hairs; those on gaster longer. Legs with shorter and weaker hairs. Antennal scape with relatively long and erect hairs; those on flagellum shorter and sparser. Petiole and subpetiolar process with short inconspicuous pubescence. Body reddish brown; head and mesosoma darker than gaster. Clypeus, mandibles, legs paler in colour.

***Ponera denticulata* (winged queen)**

Labels: 1. Round; smaller and upper one: white, printed ‘Holo-’ ‘type’ in two rows; larger and lower one: red. 2. Rectangular and white; upper side: ‘*Ponera denticulata* Smith’ (hand-written); under side: ‘C. G. Hope’ (printed). 3. Rectangular, white: ‘type’ (hand-written), ‘F. Sm. Coll. 79-22’ (printed).

Body 10 mm long. Forewing 8.5 mm long. Head strongly rugose over the surface. Clypeus longitudinally striate, but laterally only micropunctured; anterior margin distinctly denticulate. Outer part of frontal lobe not sculptured, shining. Eye relatively large; its maximum length as great as the distance between lower eye margin and mandibular base. Mandible finely, densely striate almost over the surface, with 4 large teeth and a narrow belt along them smooth and shining. Antennal scape relatively short; flagellar segments relatively short; segments 7-11 broader than long or as broad as long. Ocelli small, arranged in an almost regular triangle. Mesosoma coarsely rugose, not shining; rugae on pronotum concentric but as seen from above transverse; those on mesoscutum also concentric; those on scutellum longitudinal; those on propodeum transverse; posterior face of propodeum much more weakly rugose; posterolateral edge developed, plate-like, but upper margin not distinctly denticulate. Petiole not very broad, apically deeply emarginate; anterior face very finely microsculptured and shining; posterior face not observable, but at least partly striate. Gastral tergites and sternites micropunctate (punctures ill defined) and somewhat shining. Wings moderately and relatively evenly infusate. Body blackish brown; mandibles, anterior margin of clypeus, antennae, legs, posterior margins of tergites, and sternites partly reddish.

**Identity of *Ponera denticulata***

Comparison of the type materials of *Ponera transversa* and *P. denticulata* revealed that they belong to different species. Although the type of *P. denticulata* is not a worker but a winged queen, the comparison with the syntype of *P. transversa* (worker) was possible because in *Odontoponera* workers and queens have principally the same set of characteristics except for the different structures in the thorax. The type of *P. denticulata* closely agreed with the queens of one of the two species I recognized but disagreed in important characters with one and the only queen of the other (*O. transversa*) in my collection.

The two species can be distinguished by the following set of characters. Although most of the criteria are variable in both species, the first two are relatively constant in each species. A detailed analysis of this variation will be given in a separate paper.

1. *Relative length of antennal scape.* In *O. transversa* the antennal scape is relatively long, when laid back along the dorsal surface of the head surpassing the posterior margin of the head by

more than a length of the first funicular segment (sometimes by a length of the apical antennal segment) . In *O. denticulata* the antennal scape is much shorter, usually passing the posterior margin of the head by less than a length of the first funicular segment (Fig. 1 vs. 2). This character is most reliable throughout the region, and if applied together with the eye size, can serve to sort almost all the individuals including queens.

2. *Size of eye.* In *O. transversa* the eye is relatively small: the ratio of the minimum distance between the anterior margin of the eye and the anterior margin of the gena to the maximum length of the eye ranges from 1.5 to 2.0 in the worker (1.45 in the single queen examined). In *O. denticulata* the eye is larger: this ratio ranges from 1.2 to 1.4 in the worker (almost 1.0 in several queens examined).
3. *Development of raised area on vertex.* In *O. transversa* the vertex of the head medially has a well-developed raised area that is semi-circular to triangular and anteriorly sharply defined (Fig. 1, arrow). In *O. denticulata* the vertex medially has a less defined raised area. These conditions are more easily observed in profile.
4. *Condition of rugae on mesosoma.* In *O. transversa* the rugae on mesosoma are finer than in *O. denticulata*; both the bottom and ridge of ruga are shining. In the latter the rugae are deep and opaque. This character was mentioned by Creighton (1929) when he described the subspecies *nitens* (= *O. transversa* in the present paper) from Borneo, and is useful to discriminate between the two species. In some *O. transversa* specimens that are wrongly treated (e.g., left in pitfall traps long time) the rugae are opaque.
5. *Pilosity on subpetiolar process.* As mentioned by Creighton (1929) the subpetiolar process is generally poorly pilose or even bare in *O. transversa* (= *O. t. nitens* sensu Creighton), while it has longer and denser hairs in *O. denticulata* (= typical *O. transversa* sensu Creighton). This character is also useful when combined with other characters, but the conditions are variable in both the species.
6. *Condition of propodeal denticles.* In *O. transversa* the divergent carinae at the angle of the dorsal and posterior faces of the propodeum are reduced to two (or rarely only one) small teeth, while more than two larger teeth (generally three) can be seen in *O. denticulata* (cf. Creighton, 1929). This is useful but not decisive.
7. *Body colour.* Body colour is generally lighter in *O. transversa*; the whole body is often reddish or brownish with much paler legs. In *O. denticulata* the body is generally much darker (sometimes almost black) with somewhat reddish legs (Fig. 3 vs. 4). However, in some *O. transversa* specimens the body is very dark-colored as in *O. denticulate*. Also remember that teneral individuals of *O. denticulata* are naturally lighter in coloration, and thus cannot be separated from *O. transversa* by coloration alone. Teneral workers are occasionally encountered on the ground among foragers as well as in the nest. Although Creighton (1929) claimed that the coloration of *O. transversa* (= *O. t. nitens* sensu Creighton) workers is very peculiar, this

character should be used together with more reliable characters.

## Discussion

The two species can be almost always separated using the first two characters (relative length of the antennal scape and eye size). The other characters are also useful to ensure the identification. Seen from back the petiole is generally narrow and often with a deep median incision apically in *O. transversa*, while in *O. denticulata* it is often very wide and the apical incision tends to be shallower. However, as pointed out by Creighton (1929) the conditions vary widely in both the species. The sculpturation on both the anterior and posterior faces of the petiole is also highly variable.

They inhabit very different habitats. *O. transversa* lives in fairly good forests, while *O. denticulata* prefers disturbed areas (often bare ground) at least when they are sympatric in distribution. For example in Lambir Hills National Park, Sarawak, Borneo, they never coexist in one place; the former lives in the primary forest and the latter around head quarters of the park. In Bogor Botanical Gardens, West Java, where both species are very common (Ito et al., 2001), their habitat preference is less distinct, but *O. transversa* is seen wetter and darker places and *O. denticulata* is more commonly collected around buildings.

Up to now *O. transversa* has been collected from the Sundaland, i.e., Borneo, Java, Sumatra, Singapore and Malay Peninsula (including southern Thailand). *O. denticulata* has a wider range of distribution from the Philippines through Sundaland to the continental Asia such as Thailand, Myanmar, Vietnam, Laos, S. China, Bangladesh, N. India and Pakistan (Eguchi et al., 2005; Hannan, 2007; Jaitrong, 2005; Yamane et al., 2003; Yamane, unpublished data). The record of *O. transversa transversa* from Indian Himalaya by Bharti (2008) needs confirmation. Further intensive surveys may detect *O. transversa* from isolated wet forests in non-peninsular Thailand and Vietnam.

*Ponera reticulata* F. Smith (1858) was described from Burma (Myanmar) based on the male sex. According to the type locality this is most probably conspecific with *Odontoponera denticulata*. Although both *reticulata* and *denticulata* were described in the same publication (Smith, 1858), I choose *denticulata* because I do not have enough material of male *Odontoponera* to find constant specific differences and because there is still a possibility of the occurrence of *O. transversa* in isolated Burmese rainforests.

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