

A new species of *Epidendrum* (Orchidaceae) from the Brazilian Atlantic forest of Espírito Santo

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Background – *Epidendrum* (Orchidaceae) is a large genus that contains c. 800 species in the neotropic region. As a result of fieldwork conducted in the protected areas of the Atlantic forest remnants of Espírito Santo, Brazil, we have found a new orchid species that is described and illustrated in this paper.

Methods – Herbarium collections were consulted for identification and compared with the new species. Morphological data were obtained through the study of herbarium specimens as well as of live specimens collected in the field.

Key results – *Epidendrum patentifolium* Fraga, A.P.Fontana & L.Kollmann, a new species endemic to the Atlantic forest areas of central Espírito Santo in Brazil, is described and illustrated. Comments on its ecology, geographical distribution, and conservation status are provided. The new species is morphologically similar to *E. ochrochlorum* Barb.Rodr., *E. proligerum* Barb.Rodr., and *E. parahybunense* Barb.Rodr., from which it differs by short proligerous rhizomes, short and patent leaf blades, with purple lower surface and short peduncles. In accordance with the status and criteria of the IUCN Red List of endangered plant species, it must be considered as Vulnerable.

Key words – *Epidendrum patentifolium*, *Epidendrum ochrochlorum*, *Epidendrum proligerum*, *Epidendrum parahybunense*, Brazil, endemism, Espírito Santo, new species, taxonomy.

INTRODUCTION

The eastern Brazilian Atlantic coastal forest extends for more than 3000 km as an almost continuous band formed by a chain of mountain ranges that parallel the Atlantic Ocean (Mori et al. 1981). Although at present highly fragmented, it is one of the places on earth with the highest biodiversity (Myers et al. 2000). Some of these fragments with special interest because of their high biodiversity and thus a good site for biological research on the Atlantic forest are located in the municipality of Santa Teresa, in the state of Espírito Santo. According to recent research on trees, birds, mammals, and butterflies, there is a high biological richness in this region, even when compared with other Atlantic forest areas (Mendes & Padovan 2000).

The neotropical genus *Epidendrum* L. has c. 800 species and is one of the largest genera of the Orchidaceae (Dressler 1993). Pabst & Dungs (1975, 1977) recognized c. 100 species for Brazil. Currently, there are 133 recognized species, distributed throughout Brazil (81 of them are endemic to Brazil), with most occurring in the southeastern Brazil, in the states of Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo (Barros et al. 2013). In the World Checklist of

plants presented by Govaerts et al. (2013), 142 species of the genus were recognized for Brazil, the difference in the number of species recognized is mostly due to synonymy adopted by different authors.

The new species belongs to the proligerous group formed by species with proligerous stems (Pabst & Dungs 1975). Five of them are recognized in Brazil (*E. ochrochlorum* Barb.Rodr., *E. proligerum* Barb.Rodr., *E. parahybunense* Barb.Rodr., *E. obergii* A.D.Hawkes and *E. ecostatum* Pabst ex Angely), with all occurring in the rainforest biome and with the new species most resembling the first three. The new species, discovered during the fieldwork conducted between 2000 and 2002 in the Atlantic forest area of Espírito Santo, increased the size of the group to six species. The new species is described and illustrated below.

MATERIAL AND METHODS

Collections of the herbaria BHCB, CEPEC, HB, MBML, R, RB, and SP were consulted for identification and the type material of related species were compared with the specimens of the new species. Morphological data were obtained

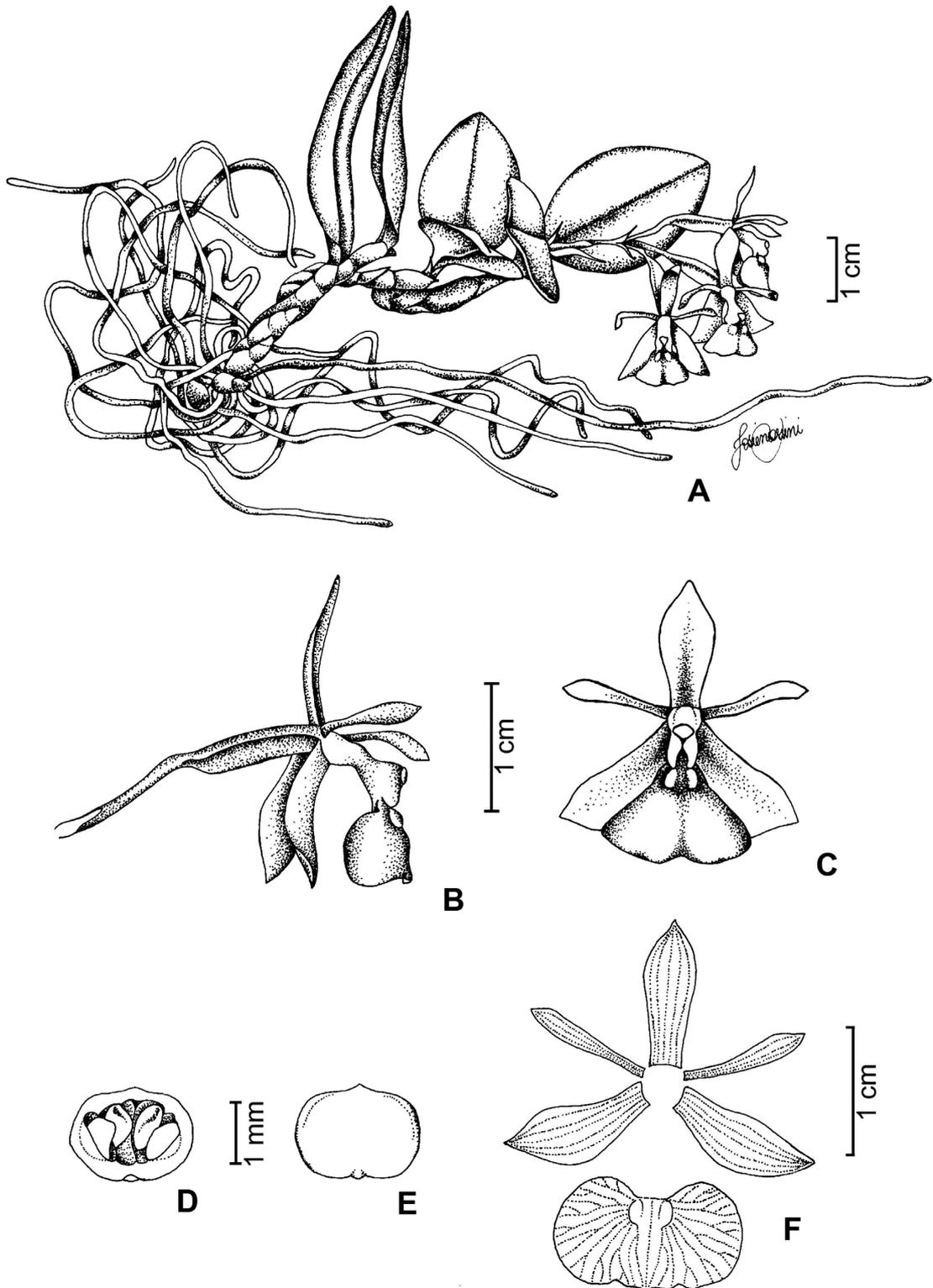


Figure 1 – *Epidendrum patentifolium*: A, habit; B, flower in lateral view; C, flower in front view; D, anther, from below; E, anther, from above; F, dissected flower. From *Vervloet et al.* 564.

through the study of herbarium specimens as well as of live material collected in the field (2000–2004). The description and illustrations are based on live and dried material studied using a stereomicroscope; morphological characters are based on Harris & Harris (2001) and Hickey & King (2000). Voucher specimens were pressed according to Fidalgo & Bononi (1984) and deposited at the Herbarium of the MBML.

Distribution of the new species is presented with municipality limits and native vegetation remnants. The map was made using DIVA-GIS program, version 5.2 (Hijmans et al. 2005). The conservation assessment complies with the criteria of the IUCN (2001), where the extent of occurrence (EOO) and the area of occupancy (AOO) were estimated using GeoCAT program, when AOO based on defined cell width 5 km (Bachman et al. 2011).

SPECIES DESCRIPTION

Epidendrum patentifolium Fraga, A.P.Fontana & L.Kollmann, **sp. nov.**

The new species most resembles to *E. ochrochlorum*, *E. proligerum*, and *E. parahybanense* but may be easily distinguished from them by its short proligerous rhizomes, short and patent leaf blades, with the purple lower surface, and short peduncles. – Type: Brazil, Espírito Santo, Santa Teresa, Nova Lombardia, Reserva Biológica Augusto Ruschi, Prop. Dra. Marlene, antiga estrada, 25 Jul. 2002 (fl.) Vervloet, Bausen & Pizziolo 564 (holo-: MBML).

Epiphytic, creeping herb, up to 10 cm tall. **Roots** many, 1 mm diam., terete, filiform, flexuous, glabrous. **Rhizome** creeping, ramified, shortly proligerous. **Stems** 1.3–3.0 × 0.3–0.5 cm, erect, simple, with 2 to 4 sheaths of leaves, green. **Leaves** patent, articulate, sheathing at base, 1–3 at the stem apex, occasionally caducous, blades 2.0–5.5 × 0.8–2.3 cm, membranaceous, oblong-lanceolate to sometimes obovate, the base cordate or shallowly cordate, the apex acute, margins entire, green at the adaxial surface and purple abaxially. **Inflorescences** 3 to 8-flowered, terminal, short, up to 1.5–2.3 cm long, spicate, arching green; floral bracts inconspicuous 3–5 × 1–2 mm, lanceolate, green when young turning paleaceous at anthesis. **Flowers** green to yellowish, resupinate, produced in succession but usually remaining open together, glabrous; **ovary** with pedicel up to 9–19 × 1.5–3 mm, terete, slightly clavate, the margin entire, greenish; **dorsal sepal** 9–11 × 3–4 mm, oblong-lanceolate, concave, membranaceous, base cuneate, apex acuminate, margins entire, 5-veined, green to yellowish; **lateral sepals** 9–13 × 3–5 mm, free, ovate-lanceolate, base cuneate, apex cuspidate, margins entire, 5-veined, green to yellowish; **petals** 8–11 × 1.5–2 mm, lanceolate to spatulate, base acuminate, apex acute, margins entire, 3-veined, green to yellowish; **labellum** entirely fused to column at the base, the free part 3-lobed, 5–8 × 9–13 mm, wide when spread, disc provided with a pair of divergent callosities at the base, convex, deflexed, transversely oblong, margins entire, strongly revolute; lateral lobes 5–8 × 4–6 mm, elliptic-rounded, with strongly revolute lateral margins; apical lobe 0.5–1 × 5–7 mm, rounded, emarginated to apiculated at the

apex, green to yellowish; **column** 5–6 × 1.5–2 mm, clavate, slightly arcuate, apex adaxially prolonged into a hooded, dental lamella; anther 1.5–2 × 1–1.5 mm, ovoid, bearing four equal, bilaterally flattened, somewhat obovate, pollinia 0.5–0.6 × 0.3–0.5 mm, green to yellowish toward the base and purplish-lilac toward the apex. **Capsule** not seen. Figs 1 & 2.

Distribution – Endemic to Espírito Santo in Brazil and known from only two municipalities. The species was found in the Augusto Ruschi Biological Reserve and in Santa Lúcia Biological Station at 600–800 m a.s.l. in Santa Teresa municipality and in the Environmental Protection Area of Goiapaba-Açu at 800 m in Fundão municipality (fig. 3).

Additional specimens examined – **Brazil:** Espírito Santo, Santa Teresa: Nova Lombardia, 5 Aug. 1976 (fl.), *n.c.* (MBML, spirit); Nova Lombardia, Reserva Biológica Augusto Ruschi, trilha da divisa estrada para João Neiva, 11 Jun. 2002, (fl. in cultivation, 25 Jul. 2003), Vervloet, Bausen & Pizziolo 708 (MBML); Valsugana Velha, Estação Biológica de Santa Lúcia, elev. 550 m, 30 Mar. 2000 (fl.), Kollmann, Fraga & Vervloet 2788 (MBML); *ibid.*, 3 Aug. 2004 (fl.), Kollmann & Bausen 6938 (MBML); Fundão, Goiapaba-Açu, Mata primária arbustiva, lado esquerdo, topo, elev. 800 m, 28 Jun. 2003 (fl.), Fontana & Sarmento 601 (MBML).

Habitat and ecology – Found growing as epiphytes in the Atlantic forest remnants between 600 and 800 m.



Figure 2 – Vegetation physiognomy of the type locality in Espírito Santo, Brazil, and morphology of *Epidendrum patentifolium*: A, general view of the Atlantic forest in the Santa Lúcia Biological Station, Santa Teresa; B, fertile specimen; C, stem; D, peduncle of the inflorescence; E, flower in side view. A & E by C.N. Fraga; B–D by L.J.C. Kollmann.

Key to the proligerous species of *Epidendrum* from Brazil

1. Flowers with simple lip.....2
- 1'. Flowers with 3 or 4-lobed lip.....3
2. Rhizomes proligerous short. Stems short, less than 3 cm.....*Epidendrum ecostatum*
- 2'. Rhizomes proligerous long. Stems 3–10 cm long.....*Epidendrum obergii*
3. Rhizomes proligerous short. Stems short, less than 3 cm. Leaves patent, oblong-lanceolate, membranaceous.....*Epidendrum patentifolium*
- 3'. Rhizomes proligerous long. Stems 3–10 cm long. Leaves erect to erect-patent, elliptic-oblong, sub-membranaceous or coriaceous green or rarely purplish on the lower surface.....4
4. Leaves coriaceous, green to rarely purplish on the lower surface. Flowers with ovary and pedicel long, 24–26 mm long.....*Epidendrum ochrochlorum*
- 4'. Leaves sub-membranaceous, green on the lower surface. Flowers with ovary and pedicel short, less than 9 cm long.....5
5. Inflorescence 7–12-flowered, with longer floral bracts of 8–10 mm. Flowers scented, ovary and pedicel 7–9 mm long.....*Epidendrum proligerum*
- 5'. Inflorescence 3–8-flowered, with short floral bracts of 3–5 mm. Flowers non-scented, ovary and pedicel 5–7 mm long.....*Epidendrum parahybunense*

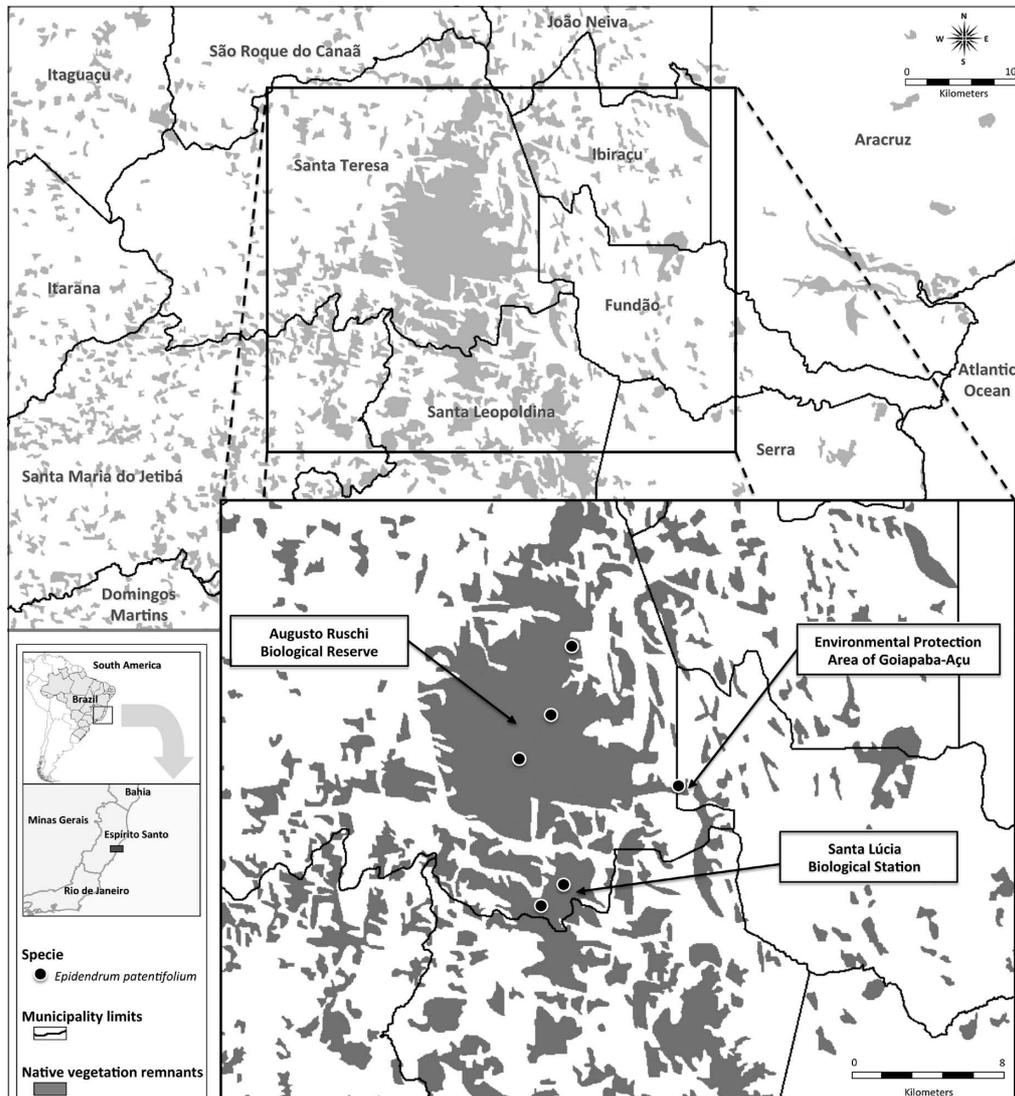


Figure 3 – Distribution of *Epidendrum patentifolium* (black dots) in Espírito Santo, Brazil.

Table 1 – Key characters and geographical distribution of the new species and its allies.

Comparison between *Epidendrum patentifolium*, *E. ochrochlorum*, *E. proligerum*, and *E. parahybunense*.

| Character | <i>Epidendrum patentifolium</i> | <i>Epidendrum ochrochlorum</i> | <i>Epidendrum proligerum</i> | <i>Epidendrum parahybunense</i> |
|---------------------------|--|--|--|---|
| Rhizome | short proligerous | long proligerous | long proligerous | long proligerous |
| Stem | short, less than 3 cm long | long, 3–10 cm long | long, 3–10 cm long | long, 3–10 cm long |
| Leaves | 2.0–5.5 × 0.8–2.3 cm | 5–8 × 1.5–2.5 cm | 5–8 × 1.5–2 cm | 6–13 × 1.5–2.8 cm |
| Inflorescence | peduncle 1.5–2.3 cm long | peduncle 2.5–3.4 cm long | peduncle 3.5–4.5 cm long | peduncle 6–7 cm long |
| Number of flowers | 3–8 | 1–3 | 7–12 | 3–4 |
| Floral bracts | 3–5 mm long | 3–5 mm long | 8–10 mm long | 3–7 mm long |
| Flowers | non-scented | non-scented | scented | non-scented |
| Ovary with pedicel | 9–19 mm long | 24–26 mm long | 7–9 mm long | 5–7 mm long |
| Dorsal sepals | 9–11 × 3–4 mm | 19.6–20.4 × 5.5–6.5 mm | 12–13 × 2.7–3.2 mm | 14–15.5 × 5–6 mm |
| Lateral sepals | 9–13 × 3–5 mm | 22–23 × 5.4–6.5 mm | 12–13 × 2.8–3.2 mm | 16.8–17.3 × 7.7–8.3 mm |
| Petals | 8–11 × 1.5–2 mm | 17–18 × 3.8–4.2 mm | 12–12.8 × 1.1–1.8 mm | 14–15 × 5–6 mm |
| Labellum | 5–8 × 9–13 mm | 8–9 × 14–15 mm | 7–8 × 11–12 mm | 9.8–10.3 × 17.6–18.3 mm |
| Geographical distribution | endemic of the Atlantic forest areas of Espírito Santo | widespread in the Atlantic forest from areas south of Bahia to Rio Grande do Sul | widespread in the Atlantic forest areas from Pernambuco to Rio Grande do Sul | restricted to Tropical Semideciduous Forest of the Minas Gerais |

Etymology – The specific epithet of the new species refers to the patent position of its leaf insertion in the stems.

Conservation assessment – *Epidendrum patentifolium* is restricted to only three localities in the Atlantic forest areas of Espírito Santo that represent three IUCN locations. The three conservation units represent Atlantic forest remnants and concentrate on the conservation of their biodiversity (fig. 3). Compared to other Atlantic forest areas, the Santa Lúcia Biological Station (fig. 2), with its close to 440 ha of Atlantic forest, is especially rich in biological diversity for the region (Mendes & Padovan 2000). The Augusto Ruschi Biological Reserve represents a fragment of Atlantic forest of 4734 ha, with its relief of steep slopes, small wetlands, and rocky outcrops at 780–1050 m of altitude, while the Environmental Protection Area of Goiapaba-Açu encompasses a fragment of the Atlantic forest of 3740 ha that is formed by slopes and rocky outcrops at 200–820 m of altitude, with both of them still poorly studied (IPEMA 2005).

The population represented by a few scattered individuals, with EOO estimated as 20 km², AOO estimated as 51,361 km², and with less than five localities. Even though all of its populations are found within the conservation units, they are prone to the effects of stochastic events within very near future. Therefore, following the criteria of the IUCN (IUCN 2001), *Epidendrum patentifolium* should be considered as vulnerable [VU: D2].

Notes – *Epidendrum patentifolium* is morphologically similar to *E. ochrochlorum*, *E. proligerum*, and *E. parahybunense*, described by Barbosa Rodrigues (1877, 1882), but may be easily distinguished from them by short proligerous rhizomes (vs. long proligerous rhizomes), short stems less than 3 cm long (vs. 3–10 cm long), smaller, patent, oblong-lanceolate, membranaceous leaves (vs. larger, erect to erect-patent, elliptic-oblong, coriaceous leaves in *E. ochrochlorum* and lanceolate to acute-lanceolate, sub-membranaceous leaves in *E. proligerum* and *E. parahybunense*) and purple on the lower surface (vs. green on the lower surface, rarely purplish in *E. ochrochlorum*).

The flowers of all species in the group are very similar, and between *E. patentifolium* and *E. proligerum* the measure intervals overlap in almost all floral parts. However, the new species differs from *E. proligerum* by its 3–8-flowered inflorescences, with short floral bracts of 3–5 mm, and non-scented flowers, similar to *E. ochrochlorum* and *E. parahybunense* (vs. 7–12 flowered inflorescences, with longer floral bracts of 8–10 mm, and scented flowers). In addition, the flower sizes in *E. ochrochlorum* and *E. parahybunense*, especially in length, are always smaller than in *E. patentifolium* and *E. ochrochlorum*, with the length of the ovary with pedicel being one diagnostic character differentiating these species (9–19 mm in *E. patentifolium* and 24–26 mm in *E. ochrochlorum* vs. 7–9 mm long in *E. proligerum* and 5–7 mm long in *E. parahybunense*). Additional diagnostic characters are presented in table 1.

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