On the validity of the species *Exechiopsis aemula* Plassmann and *Exechiopsis pulchella* (Winnertz) (Diptera, Mycetophilidae)

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The morphological differences between the species *Exechiopsis pulchella* (Winnertz, 1863) and *E. aemula* Plassmann, 1984 are discussed, based on an analysis of the taxonomic literature and the study of type material. The validity of the second species is established. Detailed illustrations of male genitalia for both species are given.

Key words: Diptera, Mycetophilidae, *Exechiopsis*, taxonomy, Europe.

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INTRODUCTION

When studying European material of the subgenus *Exechiopsis s. str.* Tuomikoski, 1966 a problem occurred in the identification of the species *E. (s. str.) pulchella* (Winnertz, 1863) which brought about an analysis of the literature and review of available type material.

In the Palaearctic region another two species were described, close in morphological characteristics to *E. pulchella*. Both of them have been reported subsequently as junior synonyms: *E. forciposa* (Tollet, 1955) – synonymised by Hackman (1988) with remark «questionable»; *E. aemula* Plassmann, 1984 – synonymised by Ševčik (2001). During the original study two groups of specimens could clearly be distinguished and the validity of the species *E. aemula* was established by study of type material. The difference between the species appears primarily in the structure of male genitalia, which is discussed below.

METHODS AND ABBREVIATIONS

The studied material includes specimens preserved on pins and of specimens preserved in 70% alcohol. For each dry preserved specimens the genitalia were separated from the abdomen and heated in 15% KOH for maceration. The remaining chitinous parts were washed with acetic acid and distilled water for neutralisation and inserted into glycerine. The genitalia were preserved as glycerine preparations. For material preserved in alcohol there was no need for maceration of the genitalia, as the observation of their structure was possible directly.

Abbreviations of museums in which material are deposited:

IZBE – Institute of Zoology and Botany, Estonian Agriculture University, Estonia;

JŠPC – Jan Ševčik Personal Collection, Ostrava, Czech Republic;

MNHN – Muséum National d'Histoire Naturelle, Paris, France;

ZMAN – Zoölogisch Museum Amsterdam, Nederland;

ZSM – Zoologische Staatsammlung in München, Germany.

THE SPECIES

Exechiopsis (Exechiopsis) aemula Plassmann

Figures 2, 4, 6, 8.

Execiopsis (Exechiopsis) aemula Plassmann, 1984

Exechiopsis (Exechiopsis) pulchella (Winnertz, 1863): Krivosheina et al. (1986); Kurina (1998); Ševčik (2001).

Diagnostic characters. Mesonotum entirely yellow or light brown with yellow shoulders. Pleural parts yellow to brownish. Head brown. Scape and pedicel and basal half of first flagellomere yellow, other segments of flagellum brown. Legs yellow, tarsi brown. Abdomen entirely brownish or with yellowish bands on hind margins of tergites. Wings clear, apical part of R_5 distinctly convergent with M_1. Proepisternum with one bristle.

Male genitalia: depth of ventral cavity of gonocoxite forms one third of the height of the gonocoxites; medial appendage of gonocoxite apically somewhat angled; ventral appendage of gonostylus without distinct medially directed lobe, existing only as a bump; medial appendage of gonostylus curved on apical third, with two combs of spines, the apical consisting of two spines, one of them longer, the subapical comb located on upper third of appendage (sometimes two combs almost coalesce) and consist of 10–13 spines.

Type material. Holotype (studied): 1 ♂, Sweden, Ängerån, 20–30 Sept. 1977, K. Müller leg. [ZSM]. Paratypes (studied): 2 ♂♂, Sweden, Ängerån, 10–20 Sept. 1977, K. Müller leg. [ZSM].

Material. Nederland. 2 ♂♂, Hilversum, 10 May 1908 and 1 Oct. 1916, de Meijere leg. [ZMAN]. **France.** 1 ♂, Forêt d'Orléans (45), Massif de Lorris, 23 Aug. 1978, J. Clastrier leg. [MNHN]. **Czech Republic.** 1 ♂, Bohemia, Sumava, Nová Húrka beat-bog, 20 Aug.–24 Sept. 1999, M. Barták & S. Kubik leg. [JŠPC]. **Germany.** 42 ♂♂, Rastorf b. Kiel, 4–14 March 1974 and 8 Oct.–1 Nov. 1974, F. Sick leg. [ZSM]. **Norway.** 1 ♂, Akershus, Østmarka, Tappenberg, reared by eclector from spruce root, 9 May–29 Aug. 1996, B. Økland leg. [IZBE]. **Sweden.** 13 ♂♂, Ängerån, 21–30 Sept. 1977, K. Müller leg. [ZSM]; 11 ♂♂, Abisko, 28 July – 18 Aug. 1975, 11 – 25 Aug. 1975, 15 – 22 Sep. 1975, 18–26 Aug. 1976 and 13–20 Sept. 1976, K. Müller leg. [ZSM]; 4 ♂♂, Norrbyn, S. Umea, 20 Sep.–31 Oct. 1985 and 1–10 Aug. 1986, K. Müller leg. [ZSM]. **Estonia.** 1 ♂, Järvselja, sweep netting, 25 Aug. 1989, O. Kurina leg.; 4 ♂♂, Nigula Nature Reserve, sweep netting, 1 July, 24 Sept. and 25 Sept. 1999, O. Kurina leg.; 1 ♂, Oonga, sweep netting, 3 Oct. 1995, O. Kurina leg.; 3 ♂♂, Endla Nature Reserve, light trap, 8–15 Oct. 1995, K. Kimmel leg. [all in IZBE].

Exechiopsis (Exechiopsis) pulchella (Winnertz)

Figures 1, 3, 5, 7.

Exechia pulchella Winnertz, 1863

Exechia intersecta (Meigen, 1818): Lundström, 1909

Exechia pulchella Winnertz, 1863: Lundström, 1912

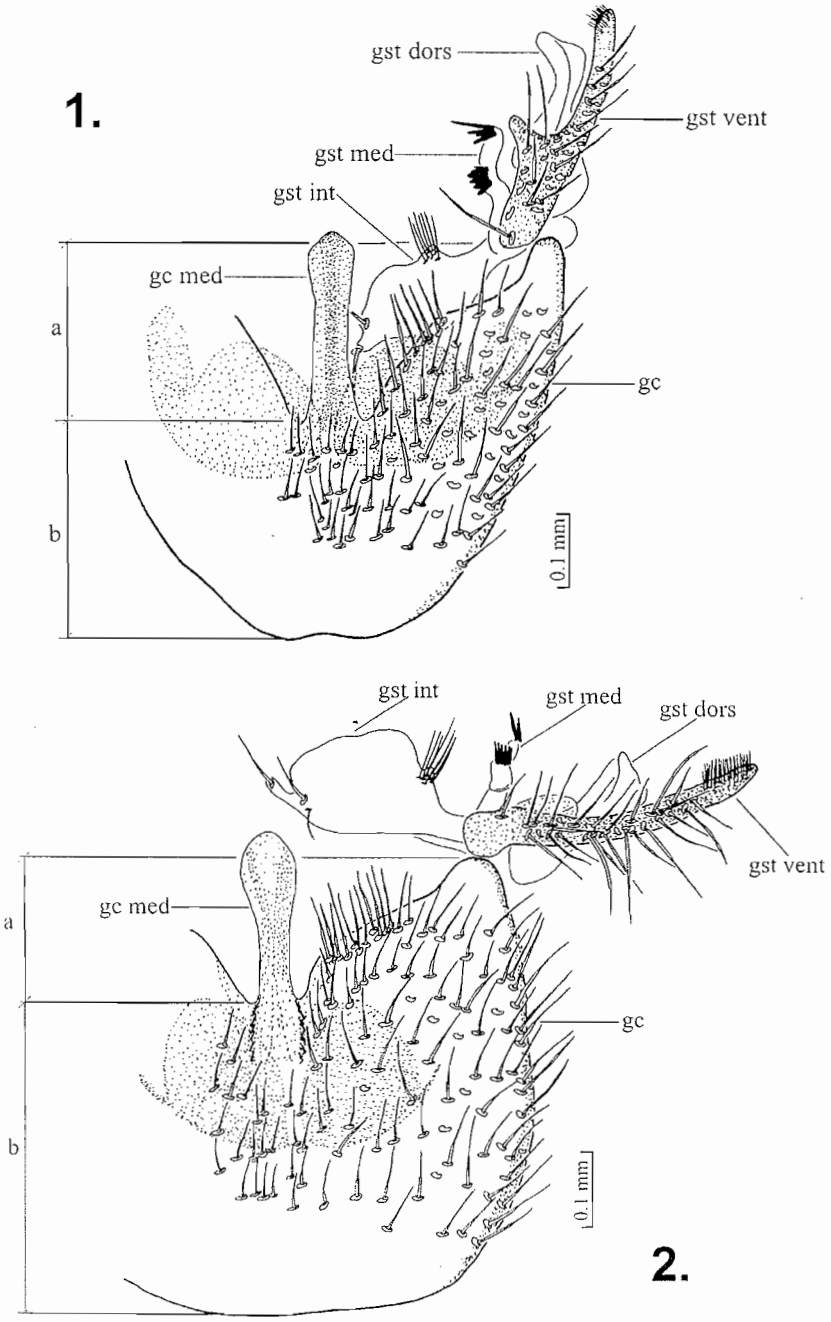
Exechia forciposa Tollet, 1955

Exechiopsis (Exechiopsis) pulchella (Winnertz, 1863): Kurina (1998).

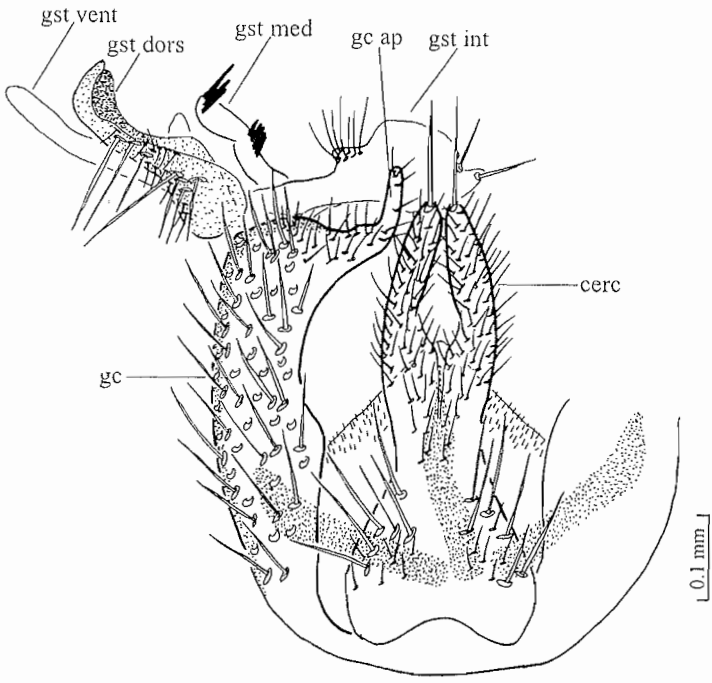
Diagnostic characters. Mesonotum light brown with yellow shoulders. Pleural parts yellow to brownish. Head brown. Scape and pedicel and basal half of first flagellomere yellow, other flagellomeres brown. Legs yellow to brownish, tarsi brown. Abdomen entirely brownish or with dispersed yellowish bands on hind margins of tergites. Wings clear, apical part of R_5 distinctly convergent with M_1. Proepisternum with one bristle.

Male genitalia: depth of ventral cavity of gonocoxite equals half of the height of the gonocoxites; medial appendage of gonocoxite apically rounded; ventral appendage of gonostylus with distinct medially directed lobe; medial appendage of gonostylus curved, with two combs of spines, the apical consisting of 3–4 spines, one of them usually longer, the subapical comb located on middle of appendage and consisting of 3–6 spines. Male genitalia are represented on Figures 1, 3, 5 and 7.

Material: Italy. 1 ♂, Aosta, Valgrisanche, Chamencon, alt. 1280 m, 12 Sept. 1974, L. Matile leg. [MNHN]. **Germany.** 1 ♂, Freiburg, Bechtaler Wald, 20 March 1985, FVA-Abt. Ws. leg. (= Forstliche Versuchs und Forschungsanstalt Baden-



Figures 1–2. Ventral view of male genitalia. **1.** *Exechiopsis pulchella* (Winnertz, 1863); **2.** *Exechiopsis aemula* Plassmann, 1984. Abbreviations: gc = gonocoxite; gc med = medial appendage of gonocoxite; gst dors = dorsal appendage of gonostylus; gst vent = ventral appendage of gonostylus; gst med = medial appendage of gonostylus; gst int = internal appendage of gonostylus; a = depth of ventral cavity of gonocoxite; b = height of gonocoxite.



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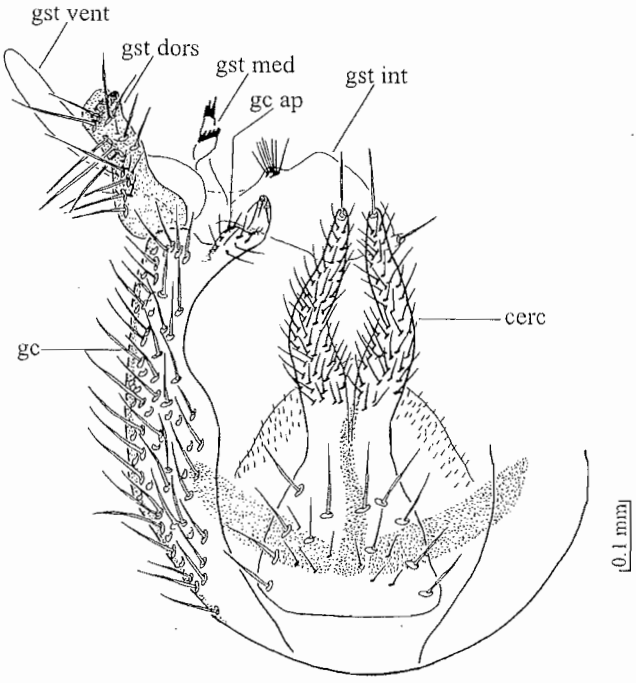
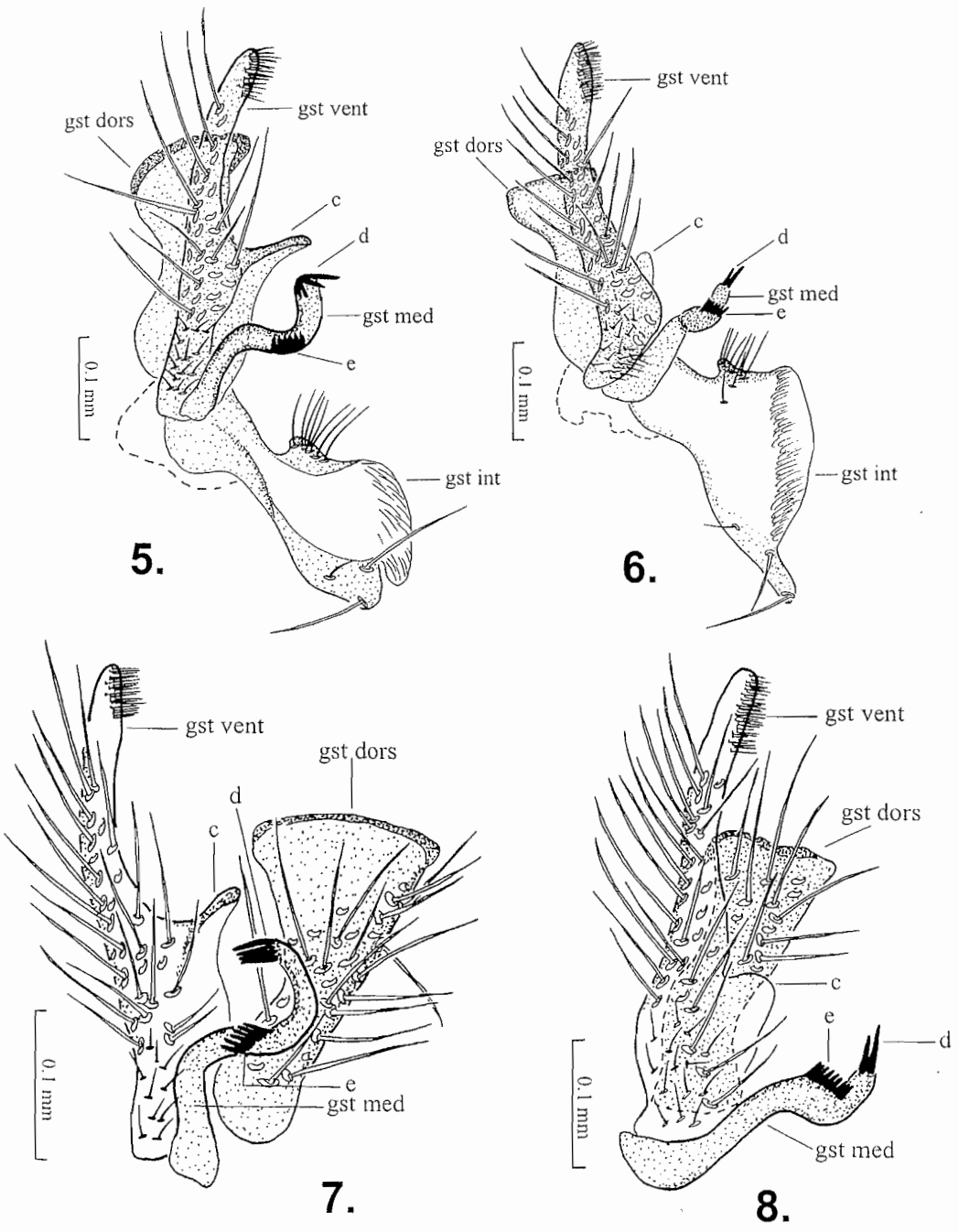


4.

Figures 3–4. Dorsal view of male genitalia. **3.** *Exechiopsis pulchella* (Winnertz, 1863); **4.** *Exechiopsis aemula* Plassmann, 1984. Abbreviations: cer = cerci; gc ap = apical appendage of gonocoxite; other abbreviations see Figures 1, 2.



Figures 5–8. Ventral (Figures 5, 6) and internal (Figures 7, 8) views of gonostylus.
5, 7. *Exechiopsis pulchella* (Winnertz, 1863); **6, 8.** *Exechiopsis aemula* Plassmann, 1984. Abbreviations: c = medial lobe of ventral appendage of gonostylus; d = apical comb of spines on medial appendage of gonostylus; e = subapical comb of spines on medial appendage of gonostylus; other abbreviations see Figures 1, 2.

Württemberg, Abt. Waldschutz, Freiburg) [ZSM]. **Norway.** 2 ♂♂, Akershus, Østmarka, Tappenberg, reared by eclector from spruce root, 9 May–29 Aug. 1996, B. Økland leg. [IZBE]. **Sweden.** 18 ♂♂, Abisko, 10–20 June 1975, 27 July–4 Aug. 1975, 11–25 Aug. 1975, 1–8 Sept. 1975, 7–14 June 1976 and 23–30 Aug. 1976, K. Müller leg. [ZSM]. **Estonia.** 1 ♂, Endla Nature Reserve, light trap, 8–15 Oct. 1995, K. Kimmel leg. [IZBE].

DISCUSSION

There are no illustrations of genitalia included in Winnertz's description (Winnertz 1863) of *E. pulchella*, which is usual for a taxonomic study in the middle of the 19th century. According to Evenhuis (1997) most of Winnertz's material was originally deposited in Zoologisches Forschungsinstitut und Museum «Alexander Koenig», Bonn, Germany but moved to Poppelsdorf Castle during World War II and was probably destroyed during bombing of the castle. Consequently, it was unfortunately not possible to study the type material. However, in the beginning of the 20th century C. Lundström published a paper on mycetophiloids of Finland (Lundström 1909) with several sufficiently detailed illustrations including the figures of *Exechiopsis intersecta* (Meigen, 1818) and *E. pulchella*. These two species were both equipped with a question-mark. In the supplement of his monograph, Lundström (1912) noted that H. Dziedzicki had compared his figures with Winnertz's type material. From this Lundström concluded that his *E. intersecta* (Lundström 1909: p. 44, Figs. 153, 154) was conspecific with true *E. pulchella* and his *pulchella* (Lundström 1909: p. 45, Figs. 83, 84, 150) was a new species – *Exechiopsis pseudopulchella* (Lundström, 1912). Subsequently, Dziedzicki (1915: Plate XVII, Figs. 262, 263) figured the male genitalia of the *E. pulchella* type material by himself and they correspond with Lundström's figures.

The present discussion is based on the statement that Lundström and Dziedzicki actually figured the true *E. pulchella*. Later, several authors have used Lundström's figures for this species (e.g. Landrock 1927, 1940, Ostroverkhova & Stackelberg 1969).

While studying the material collected by R. Leru from caves in Romania, R. Tollet (1955) describ a new species – *Exechiopsis forciposa* (Toll 1955) and gave detailed figures of the male ger talia (pl. III, Figs. 10–12); however, it is appare from his figures that it is the same species figur by Lundström (1909). According to Tollet (195 the type material of *E. forciposa* is deposited the Royal Museum of Natural History in Belgiu but it could not be located by P. Limbourg (per comm.). Despite the unavailability of the type the present study support the synonymy propose by Hackman (1988), i. e. *E. forciposa* as a junic synonym of *E. pulchella*.

A. Zaitzev figured *E. pulchella* (Krivosheina a al. 1986) but his figure does not represent the sp cies figured by Lundström; however, it is appa rently conspecific with *E. aemula*. Ševčik (200 had studied the holotype of *E. aemula* but he fo lowed Zaitzev's identification of *E. pulchella* an synonymised the species. The situation that Zai zev's figure does not represent the true *E. pulchell* had already been detected by L. Matile. In th Museum of Natural History in Paris I found mate rial of *E. pulchella* determined by L. Matile an separated into two groups with handwritten labels «*Exechiopsis. (E.) pulchella* Winnertz» and «*Exe chiopsis (E.) pulchella* Zaitzev non Winnertz».

Study of the type material of *E. aemula* reveal that the two species differ mainly on the basis o male genitalia, which is discussed in Table 1 wit reference to the respective figures.

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Table 1. Morphological differences of male genitalia between *Exechiopsis aemula* Plassmann, 1984 and *Exechiopsis pulchella* (Winnertz, 1863).

***Exechiopsis aemula* Plassmann, 1984**	***Exechiopsis pulchella* (Winnertz, 1863)**
dorsal apical appendage of gonocoxite (gc ap)	
with distinct hump (Figure 4)	without such a hump (Figure 3)
cerci	
slender, without cavity on basal margin (Figure 4)	bold, with cavity on basal margin (Figure 3)
ventral cavity of gonocoxite	
relatively deep, half height of gonocoxites (Figure 1: a)	relatively shallow, about one third height of gonocoxites (Figure 2: a)
ventral medial appendage of gonocoxite (gc med)	
rounded at apex (Figure 2)	somewhat angled at apex (Figure 1)
ventral appendage of gonostylus	
without distinct medially directed lobe, existing only as a bump (Figures 6, 8: c)	with distinct medially directed lobe (Figures 5, 7: c)
dorsal appendage of gonostylus (gst dors)	
basal width about half of its apical width (Figures 6, 8)	basal width about three-quarters of its apical width (Figures 5, 7)
medial appendage of gonostylus	
curved only on apical third; apical comb consisting of two spines; subapical comb consisting of 10–13 spines and located on upper third of appendage (Figures 6, 8: d, e)	curved; apical comb consisting of 3–4 spines; subapical comb consisting of 3–6 spines and located on middle of appendage (Figures 5, 7: d, e)
internal appendage of gonostylus (gst int)	
apex tapering (Figure 6)	apex blunt (Figure 5)

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