BRIEF COMMUNICATION

On the classification of North American *Chelostoma* (Hymenoptera: Megachilidae)

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Abstract. A new subgenus of *Chelostoma* Latreille is established for the New World group historically placed in *Foveosmia* Warncke. These species, placed herein in *Neochelostoma* Engel & Griswold, new subgenus, are differentiated from the Palearctic *Foveosmia* and a modified key is provided to the subgenera of *Chelostoma*.

INTRODUCTION

The bee genus *Chelostoma* Latreille (Megachilinae: Osmiini) encompasses 56 species of slender bees distributed across the Holarctic region including the northern margins of Africa, but extending southward into the mountainous areas of tropical Asia (Michener, 2007). Species nest in pre-existing cavities in wood or stems, where females construct brood cells enclosed by mud or sand. With few exceptions, species are generally oligolectic, many in the Old World fauna on Campanulaceae or Ranunculaceae, while those of the New World are largely on Boraginaceae (*sensu* APG, 2016). Michener (2007) recognized six subgenera, two of which were considered to occur in North America: *Prochelostoma* Robertson, a monotypic subgenus endemic to eastern North America, and *Foveosmia* Warncke, a Holarctic group diverse in both western North America and the western Palearctic. Despite this arrangement, the New World *Foveosmia* are morphologically, behaviorally, and geographically distinct.
Indeed, phylogenetic work on *Chelostoma* has further demonstrated that the North American species of *Foveosmia* were ill-placed within this otherwise Palearctic clade, and in fact a more basal branch within the overall group, thereby properly restricting the subgenus to the Old World species visiting Campanulaceae (Sedivy et al., 2008). Herein the group of New World species previously placed in *Foveosmia* are diagnosed and modified couplets provided to aid in their identification and distinction from the Old World fauna. Morphological terminology follows that used by Michener (2007).

**SYSTEMATICS**

**Genus Chelostoma** Latreille

*Neochelostoma* Engel & Griswold, new subgenus


**Type species:** *Chelostoma californicum* Cresson, 1878 (Figs. 1, 2).

**Diagnosis:** The subgenus can be most readily distinguished in males from *Foveosmia* proper by the presence of apicolateral processes on the seventh tergum (Fig. 5), in addition to the medial projections (sometimes joined apically to form a single projection; e.g., *C. incisulum* Michener), and in females by the simple setae on the outer surface of the probasitarsus (Fig. 3). In males of *Foveosmia* the lateral processes of the seventh tergum are lacking (Fig. 6), while in females the setae on the outer surface of the probasitarsus are pectinately branched to plumose (Fig. 4). Unlike species of *Foveosmia* which are oligoleges of Campanulaceae (Asterales), this clade of New World species includes primarily specialists of Hydrophyllioideae [Boraginales: Boraginaceae: note that the most recent familial classification demotes Hydrophyllaceae within Boraginae (APG, 2016), but see Luebert et al. (2016) for an alternative arrangement] (Hurd & Michener, 1955; Michener, 2007), although *C. tetramerum* Michener appears oligolectic on Amaryllidaceae (*Allium* Linnaeus) and *C. minutum* Crawford is polylectic with preference for *Phacelia* Juss. and *Allium* (Sedivy et al., 2008). Female visitation by *C. minutum* supports this preference; of 152 specimens in the Pollinating Insects Research Unit collection with floral records, *Phacelia* accounts for 35% and *Allium* for 29%. Each of the 14 other genera account for <10%.

**Etymology:** The new subgeneric name is a combination of the Greek νέος (νέος), meaning, “new”, and the generic name *Chelostoma* [itself formed in Greek of χῆλη (χῆλη), meaning, “claw” and itself traditionally derived from χήμη (χήμη), meaning, “gape”, and στόμα (στόμα, genitive στομάτος), meaning, “mouth”]. The gender of the name is neuter.

**Comments:** In recent history this group of species has been treated as New World members of the subgenus *Foveosmia* (Griswold & Michener, 1998; Michener, 2007), but is clearly distinct both morphologically and in terms of its floral associations, as well as phylogenetically (Sedivy et al., 2008). The two Nearctic subgenera are allopatric; *Neochelostoma* is western, *Prochelostoma* eastern.

**Included species:** Aside from the type species (*C. californicum*), the following species are also included in *Neochelostoma: C. bernardinum* Michener, *C. cockerelli* Michener, *C. incisulum* Michener, *C. marginatum* Michener, *C. minutum* Michener, *C. phacelae* Michener, *C. tetramerum*. The keys of Michener (1938) and Hurd & Michener (1955) are sufficient to identify the described species of this subgenus.
Key to Subgenera of *Chelostoma*
(modified from Griswold & Michener, 1998; Michener, 2007)

1. Third labial palpomere flattened, its axis a continuation of that of second palpomere; seventh metasomal tergum of male with dorsal pit ....................... 2
2. Third labial palpomere not flattened, its axis directed laterally as in most

Figures 1–2. Lateral habitus of female and male *Chelostoma* (*Neochelostoma*) *californicum* Cresson.
1. Female. 2. Male.
megachilid bees; seventh metasomal tergum of male without dorsal pit (male unknown in Ceraheriades Tkalců) ................................................................. 5

2(1). Preoccipital carina present (sharply angled medially in C. ventrale Schletterer but not carinate); propodeum with sloping basal zone little more than one-half as long as metanotum; first metasomal tergum shallowly concave anteriorly [Palearctic] .................................................. Gyrodromella Michener

—. Preoccipital carina absent; propodeum with horizontal basal zone at least two-thirds as long as metanotum; first metasomal tergum with anterior surface convex except for longitudinal groove .................................................. 3

3(2). Parapsidal line half as long as tegula or more; second metasomal sternum of male without sloping platform, or, if present, then not carinate; labrum of female less than twice as long as broad (longer in C. isabellinum Warncke) .... 4
Figure 5–6. Male characters of *Neochelostoma*, new subgenus, and *Foveosmia* Warncke. 5. Seventh tergum of *Chelostoma* (*Neochelostoma*) *tetramerum* Michener, arrows indicate lateral projections. 6. Seventh tergum of *C. (Foveosmia)* *distinctum* (Stoeckhert).

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