***Megachile*** of the tallgrass prairie region and greater Midwest

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Edits: October 3, 2023 Note – *parallela* males often have mandibles with the typical tooth number (4) somewhat indistinct, so should go both ways at cplt. 29

**Males:**

1. Forecoxae each with a single anteriorally-projecting spine or triangular tooth-like process that is at least as long as broad, occasionally partly concealed by dense hairs but usually conspicuous…………..2

Forecoxae without an anteriorally-projecting spine or triangular tooth-like process, each forecoxae at most with a very small tubercle, which is occasionally acute but never spine-like or tooth-like……….34

2(1). Mid-tibia without an apical spur…………………………………………………………………………………..……..3

Mid-tibia with a single apical spur, sometimes small and pale and easily overlooked……………………….6

3(2). Abdomen black with sparse short black hairs, without pale apical fasciae; T6 preapical carina produced as a pair of large triangular teeth, margin otherwise entire; mid-basitarsi long and narrow, much longer than broad; southern portion of our region but expanding northward…………***xylocopoides***

Abdomen usually with some pale hairs and some tergites with pale apical fasciae; T6 preapical carina without a pair of large triangular teeth, but margin may be coarsely serrate with numerous irregular small teeth; mid-basitarsi much enlarged, nearly or quite as broad as long in profile………………………..4

4(3). Mid-coxae each with a short ventrally-directed spine; tarsal segments of all legs bright yellow; mandible with four teeth; central and southern parts of our region…….…………..…………………….***albitarsis***

Mid-coxae simple, without any spinelike projections; tarsal segments of mid- and hind legs mostly dark; mandible with three teeth; widespread in our region………………………………………………………………….5

5(4). Mid-basitarsi somewhat cuboidal, not narrowed or tapered to an edge ventrally; northern ½ of our region………………………………………………………………………………………………………………………....…… ***latimanus***

Mid-basitarsis tapered ventrally to an edge or keel; western margins of our region, rare…….***perihirta***

6(2). Forebasitarsi inner margin (or in some cases its ventral surface) weakly to deeply concave, and the margins of the concavity usually fringed to some extent by short setae; foretarsi usually but not always yellowish……………………………………………………….……………………………………………………….…………..7

(includes ***inimica, policaris, pugnata, fortis, gemula, melanophaea, mucida, frigida, pruina, integra, comata, ingenua, amica, oenotherae, sculpturalis***)

Forebasitarsi without a concavity along its inner margin or on its ventral surface; foretarsi usually dark in color……………………………………………………………………………………………………………………………………………..22

(includes ***georgica, parallela, townsendiana, petulans, apicalis, concinna, rotundata, deflexa, dakotensis, mendica, gentilis, brevis, pseudobrevis, texana, lippiae, addenda***)

7(6). Mid-coxal spines present, nearly as long as forecoxal spines and projecting ventrally; forecoxae above spines completely bare, without hairs or bristles or a patch of short setae; large species, usually 15mm or more; western species rarely found in the southern part of our region………………………***comata***

Mid-coxal spines completely absent; forecoxae above spines variable but usually with abundant hair or bristles or a setae patch; size variable……………………………………………………………………………………………..8

8(7). T6 with preapical carina broadly to narrowly rounded to triangular, without a median notch or associated teeth; mandible with three (rarely two) teeth……………………………………………………………….…….9

T6 with preapical carina with a median notch or a median concavity, often with associated teeth, spines or irregular serrations laterad of the median notch or concavity; mandible with three or four teeth…..13

9(8). Very large species, 15-20mm or slightly greater; T2-T5 dark and largely hairless, fascia present only on T2 laterally; T2-T3 with very large punctures contrasting with the very small dense punctures on T4; foretarsi all dark; paraocular carina on inner margin of eye carina-like and reaching to and around upper margin of eye; introduced species rapidly expanding in range.................……..……….***sculpturalis***

Size variable, occasionally very large; T2-T5 hairy, fascia present and usually complete on T2-T5; punctures on T2-T4 all similar, fine and dense; foretarsi usually yellow; paraocular carina unmodified, hardly noticeable…………………………………………………………………………………………………………………..10

10(9). Very large species, 15-20mm; hairs of head, thorax and abdomen all pale, predominantly yellowish to yellowish-orange; forecoxae with a large patch of reddish setae above the stout spines; foretarsi segment 2 ventrally with a black spot; throughout our region but infrequent……………….***fortis***

Smaller species, 10-15mm; hairs of head, thorax and abdomen more pale, rarely with some blackish or fuscous hairs intermixed on scutum and elsewhere; forecoxae ostensibly bare but with a very small, inconspicuous patch of very short dense reddish setae at the base of the spines, easily missed; foretarsal segment 2 ventrally all pale, without a black spot although black hairs may be present on the margins …………………………………………………………………………………………….…………………………………………………….11

11(10). T6 preapical carina broadly rounded across tergite; T3-T4 hairs all pale; forecoxal spines triangular; sand obligate species; central and southern parts of our region…………………………….***integra***

T6 preapical carina medially produced as a short triangle; T3-T4 hairs largely blackish; forecoxal spines narrow throughout; rare *Oenothera* specialists………………………………………………………………………………….12

12(11). Glossa extremely long, reaching to the end of the abdomen or nearly so; scutum and scutellum with considerable blackish pubescence; foretarsi dark; southern and southwestern margins of our region (OK, TX, LA, AR)……………………………………………………………………..…………………………………………..……***oenotherae***

Glossa much shorter, only reaching to the base of the abdomen; scutum and scutellum with few dark hairs; foretarsi yellow; western margins of our region (KS, OK, TX)………………………………………..……***amica***

**[Note**: the recently-described *M. chomskyi* Sheffield is very similar to *amica*, but slightly larger with a small tubercle on the medio-apical margin of the clypeus. Thus far known only from Texas it may possibly occur in Oklahoma and Kansas.]

13(8). Mandible with four teeth; T2-T4 with apical fasciae incomplete to nearly absent; forecoxae with small to large patch of dense short appressed reddish or brownish setae, or with long white hairs only ……………………………………....………………………………………………………………………………………………….14

Mandible with three teeth; T2-T4 with apical fasciae complete (unless worn); each forecoxa with 1-3(5) reddish bristles (large or small), otherwise mostly bare, or (one exception) with long white hairs only …………………………………………………………………………………..…………………………………………………….…………..19

14(13). All tarsi on all legs yellow on outer surfaces; forecoxae bare, without bristles, setae patch or other pubescence; midbasitarsi relatively long and narrow, about four times as long as broad or a little longer; southern margin of our region with several 100+ year-old records from eastern KS…………***pruina***

Mid- and hind tarsi all dark; forecoxae either with a setae patch or long white hairs; midbasitarsi shorter, no more than three times as long as broad……………………………………………………………………………………15

15(14). Forebasitarsi narrow, slightly narrower than foretibia, the concavity fringed with short black setae on its posterior margin, anterior margin largely bare; forecoxae covered with long white hairs, without a setae patch or bristles; rare species, distribution in our region unclear……….………….***ingenua***

Forebasitarsi broadened, as wide or wider than foretibia; forecoxae with a setae patch, long white hairs absent……………………………………………………………………………………………………………………..…………………16

16(15). Forecoxa setae patch large, occupying much of the anterior surface of the forecoxa; forecoxal spines long and narrow, about five times as long as broad; forefemur inner surface with several dark brown stripes on the basal half of the femur; northern species……………………………..……………***frigida***

Forecoxa setae patch reduced, occupying only a small part of the coxa; forecoxal spines shorter, length little more than twice the width; forefemur inner surface without brown stripes………..…………..17

17(16). Foretarsi predominantly light brown to dark brown in color, with occasional small amounts of pale yellow; T7 without a medial spine; F11 not spatulate, little differentiated from preceeding segments; widespread in northern and central parts of our region……………………………………….***gemula***

Foretarsi all or nearly all yellow; T7 with a short medial spine; F11 expanded, spatulate…………18

18(17). True apical margin of T6 medially with a pair of blunt projections, these twice as long as broad; forecoxal spines triangular; northern part of our region (MN,WI,MI).……………………….***melanophaea***

True apical margin of T6 medially without projections; forecoxal spines narrow, not triangular; southern half of our region…………………………………………………………………………………………………………………….***mucida***

19(13). Forcoxae with long white hairs only; forebasitarsi unmodified, narrow, dark in color, similar to midbasitarsi in appearance; throughout our region except for northern 1/3 or so…………………..***frugalis***

Forecoxae with 1-5 short or long reddish bristles, otherwise bare; forebasitarsi greatly modified, much different in appearance compared to midbasitarsi………………………………………………………………………..20

20(19). Midbasitarsi broad and flattened, several times wider than the hind basitarsi; forecoxae all yellow anteriorally with 1-2 long, stout bright red bristles above the spines; foretarsal segment 2 with long apical spine; southern ½ of our region…………………………………………………………………………***policaris***

Midbasitarsi long and narrow, similar in width to hind basitarsi, not broad and flattened; forecoxae dark, bristles (2-5) small and short; foretarsal segment 2 without long apical spine…………………………………21

21(20). Forebasitarsal concavity apex reaching to the apical margin of the second tarsal segment,

the concavity margined by uniformly brownish or pale brownish hairs; forebasitarsi tinged with brownish and yellow; lower genal margin (behind and below lower end of eye) with a small bare concave area margined by many long white hairs, often obscured by the hairs; southern 2/3 of our region………………………………………………………………………………………………………………………………….……..***inimica***

[**Note**: two subspecies have traditionally been recognized in the eastern US,the nominate form, characterized by bright reddish/ferruginous legs in both sexes and considered to be restricted to the southern states, and *inimica sayi*, characterized by dark legs in both sexes and considered to be more northern. Both forms, and intermediates, occur in the Midwest.]

Forebasitarsal concavity apex reaching to the apical margin of the third tarsal segment, the concavity with a short strip of black hairs on its inner basal margin contrasting with pale hairs elsewhere on concavity; forebasitarsi usually entirely yellow in color, and lower genal margin (behind and below lower end of eye) with a large deeply concave bare area margined by many long white hairs, readily visible; throughout our region………………………………………………………………………………………………………….***pugnata***

22(6). T2 (and sometimes T3) with an oval to narrowly oval pseudofovea on either side of midline, but these sometimes very weak; S2-S3 with very dense, extensive apical fasciae; small species, 10mm or less

…………………………………………………………………………………………………………………………………………………..23

All tergites without pseudofoveae; S2-S3 apical fasciae often but not always weak or thin; bees usually (but not always) greater than 10mm in length……………………………………………………………………………..25

23(22). T2 and T3 with a narrowly oval pseudofovea on either side of midline………………..***apicalis***

T3 without pseudofoveae……………………………………………………………………………………………………………….24

24(23). T2 pseudofoveae very obscure; forebasitarsal hair fringe slightly longer than width of forebasitarsi; small tubercle present on lower gena just behind and below base of mandible, somewhat hidden by pubescence; gonocoxites bare on inner margin, without setae…………..…..***concinna***

**[Note**: what North American biologists have been calling *concinna* may actually be *pusilla* Perez according to Soltani et. al. (2017). While *concinna* is considered a valid species by those authors, it’s occurrence may be restricted to the Antilles; it’s establishment in the US is uncertain (Soltani et. al. (2017).]

T2 pseudofoveae distinct; forebasitarsal hair fringe no longer than width of forebasitarsi; no tubercle present on lower gena just behind and below base of mandible; gonocoxites with 4-8 long stiff setae on inner margin………………………………………………………………………………………………………..***rotundata***

25(22). Forebasitarsi flattened, its length about twice its maximum width or a little more, brownish-yellowish in color; second segment of foretarsi with a large dark spot ventrally; hind basitarsi long and narrow, about 5 times as long as wide; mid-basitarsi posterior hair fringe very reduced, hardly present

………………………………………………………………………………………………………………………………………..***georgica***

Forebasitarsi not flattened, its length at least 3 times its width or longer; hind basitarsi usually shorter and broader; mid-basitarsi often with a conspicuous long hair fringe on posterior margin……………26

26(25). T6 preapical carina in lateral view with its dorsal surface evenly convex, its apical margin rounded, without a median notch, although the margin may be very weakly serrate…………………….27

T6 preapical carina in lateral view with dorsal surface flattened and depressed baso-medially, its apical margin usually notched or concave medially, sometimes weakly so, and often irregularly serrated or toothed adjacent to the median notch or concavity………….…………………………………………………………28

27(26) Foretarsi pale yellow; ventro-basal tooth of mandible broadly triangular; 12mm or so; sand obligate species, north-central portions of our region……………………….*…………………………….****dakotensis***

Foretarsi all dark; ventro-basal tooth of mandible narrowly triangular; larger, around 15mm; likely sand obligate species, southern and western margins of our region, rare..……………………………………….***deflexa***

28(26). Forecoxae with a patch of very short reddish-brown appressed hairs above the spines; T7 apically with a short stout triangular spine; ventro-basal tooth of mandible large, as large as apical (first) tooth of mandible; S2-S3 with thick, long apical fasciae; mandible teeth variable in number...…***addenda***

Forecoxae with long white hairs only above the spines; T7 usually blunt or rounded apically, at most produced as a minute point; ventro-basal tooth of mandible and S2-S3 fascia variable…………..29

29(28). Mandible with four teeth, basal tooth often hard to see if mandibles are closed…………………..30

Mandible with three teeth……….………………………….…………………………………………….……………………………32

30(29). T6 true apical margin with two pronounced teeth on either ach side of midline, visible in dorsal view; S2-S3 without apical fasciae, with long erect hairs only…………………………………………………………31

T6 true apical margin without any teeth; S2-S3 with thick apical fasciae…………………………………***petulans***

31(30). T7 apically rounded, blunt or truncate; hind basitarsis less than four time as long as wide, about 3-3.5 times as long as wide; 12-13mm long; widespread in our region……………………………… ***parallela***

T7 apically acute (but not spinose); hind basitarsis longer, about four time as long as wide, no shorter; smaller, about 10mm long; rare in our region, may possibly be found on the southern and southwestern margins of the area .....................……………………………………………………………………………..….***townsendiana***

32(29). T5 depressed apical margin without fascia; forebasitarsi ventral surface forming a very narrow basket-like structure, margined by short simple hairs and bare or nearly so internally…...……***mendica***

[**Note**: *gentilis* Cresson is very similar to *mendica* and can be mistaken for it; in our region *gentilis* is known only from eastern TX and OK. The punctures on T3-T5 are finer and closer in *gentilis*, and the forebasitarsal “basket” is less distinct though still present; *gentilis* averages a little smaller than *mendica*.]

T5 depressed apical margin with fascia but may be partially worn away; forebasitarsi ventral surface variable, either unmodified and completely hairy, or similar to *mendica* (above), but not bare internally, instead with very short appressed hairs in the center of the “basket”..…..……………………………….33

33(32). T5 pre-apical margin raised above or overhanging the depressed apical area, this pre-apical margin carinate or subcarinate throughout its width (across the tergite), only slightly reduced medially if at all; forebasitarsi ventral surface similar to *mendica* (above), but not quite as distinct, and not bare internally, but instead with very short appressed hairs in the center of the “basket”; usually larger species, 12mm or more………………………………………………………………………………..…………………….***texana***

[**Note**: *M. lippiae* Cockerell is nearly identical to *texana*, and was considered a synonym until recently, see Sheffield et. al. (2011) and Byzdk (2012). The status of this species in the eastern US is problematic. *M. lippiae* males are said to differ from *texana* in having few if any dark hairs on the scutum and few dark hairs on the tergites (only present laterally), see citations above. However, while most records of *lippiae* are western there are specimens from the eastern US and Midwest that agree with the pubescence characters of *lippiae*. More work needs to be done with these two taxa to see if there are structural, biological or ecological differences between them. There appear to be subtle differences between western US specimens of *lippiae* and *texana* in the apices of the gonocoforceps, and the forebasitarsal “basket” of *lippiae* is reduced and only present basally, where it is complete in *texana*. To date, I haven’t seen any specimens of *lippiae* from the eastern US or Midwest with those two characters.]

T5 pre-apical margin not raised above or overhanging the depressed apical area except at lateral margins, and very reduced or absent medially; forebasitarsi completely hairy ventrally; usually smaller, less than 12mm…………………………………………………………………………………………….………………..***brevis***

[**Note**: *M. pseudobrevis* is a recently-recognized species, formerly considered a sub-species or synonym of *brevis,* see Sheffield et. al. (2011) and Byzdk (2012). Distinguishing features are the dominance of black hairs on the tergites (other than the white fasciae) in *pseudobrevis*, true *brevis* having all or nearly all pale hairs on the tergites. *M. pseudobrevis* is considered a southeastern species, but male *brevis* specimens with all or nearly all black hairs on the tergites occur in the Midwest, as well as intermediates.]

34(1). Mandible without a ventral tooth or angle, the ventral margin of the mandible entire; forecoxae with deep, close punctures, lacking any tubercles; a pair of very narrow lines of pubescence extending posteriorally from the anterior margin of the scutum, on either side of the midline; T6 with the preapical carina absent…………………………………………………………………………………………………….***rugifrons***

Mandible with a ventral tooth or angle, situated either basally or medially; forecoxae each often with a small tubercle, without deep, close punctures, if punctures present they are very fine and shallow; the anterior margin of the scutum without any narrow lines of pubescence extending posteriorally on either side of the midline; T6 with the preapical carina present but sometimes reduced, usually notched or medially concave……………………………………………………………………………………………………………….....35

35(34). Mandible with the ventral tooth located medially; forebasitarsi broadened and concave ventrally; forecoxae each with a very small tubercle; only three sternites visible (unless abdomen has been purposefully extended); T6 preapical carina reduced………………….……………………………....……36

Mandible with ventral tooth located basally; forebasitarsi simple, narrow, not expanded or concave ventrally; forecoxae with or without tubercle; four sternites visible (unless abdomen has been purposefully extended); T6 preapical carina clearly present.………………………………………………………….37

36(35). Forecoxa hairs short, dense, mostly appressed; forebasitarsi twice as long as wide, pale in color; most hind basitarsi hairs several times longer than width of basitarsi…….………………….***exilis***

Forecoxa hairs longer, not appressed; forebasitarsi longer, at least 2 ½ times as long as wide or longer, dark in color; most hind basitarsi hairs no longer than the width of basitarsi….…………***campanulae***

37(35). T6 surface very densely and closely punctate, punctures small, deep and contiguous; forebasitarsi hairs uniformly short, only about half the length of the basitarsi; forecoxae often with an acute tubercle but this is variable, tubercle often very obscure and not acute ……….………….***montivaga***

T6 surface very obscurely punctate, often impunctate, punctures never deep, dense and contiguous; forebasitarsi hairs longer, variable in length but most hairs as long as the basitarsi; forecoxae tubercles obscure to absent……………………………………………………………………………………………….........……………..38

38(37). Vertex long, the distance from lateral ocelli to the hind margin of vertex nearly twice the distance between the lateral ocelli (as 10 is to 6); usually large, 13mm or more, but size variable

…………………………………………………………………………………………………………………………………………***inermis***

Vertex shorter, little if any longer than the distance between the hind ocelli; usually smaller, less than 13mm……………………………………………………………………………………………………………………………………….39

39(38). Clypeus anterior margin with a small median tubercle but often hidden by pubescence; T6 preapical carina often with a weak notch or concavity…………………………………….………………..***relativa***

Clypeus anterior margin without a small median tubercle; T6 preapical carina entire, without a weak notch or concavity………………………………………………………………………………………………………..***centuncularis***

**Resources**: Soltani et. al. (2017); Sheffield (2013); Bzdyk (2012); Sheffield et. a. (2011); Gonzalez and Griswold (2007); Mitchell (1934, 1935a, 1935b, 1936, 1937a, 1937b, 1937c, 1937d, 1962)

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