

South Australia: 1♀, Coward Springs (29°24'S, 136°49'E), May 1981, G.A. Holloway (RODD); 2♀♀, same data as holotype (SAM); 6♀♀, nr N end of Lake Torrens (30°08'S, 137°15'E), Oct 1971, TFH, on *Acacia* (SAM); 4♂♂, nr N end of Lake Torrens (30°09'S, 137°11'E), Oct 1971, TFH, on *Eremophila freelingii* (SAM); 7♀♀, 9♂♂, 1 mi (1.6 km) S of Andamooka HS (30°44'S, 137°12'E), 23 Oct 1971, TFH, on *Hakea* (SAM).

Diagnosis. Clypeal processes unique. Female with head and mesosoma dark brown to black, metasoma light red-brown, clypeus set at distinct angle to frons, ventral margin with large tooth-like processes, inner orbits diverging below, frons striate, pronotal lateral vertical surface with several deep grooves, mesoscutum smooth and highly polished, sparsely punctate with minute punctures, parapsidal line barely impressed, dorsal surface of propodeum rugulose, defined by posterolateral carinae set well below dorsal level, fore tibial spur fan-shaped. Male with head and mesosoma dark brown, metasoma brown, clypeus flat, set at distinct angle to contours of frons, labrum large, as in female, antennae moderately long (FL 1.84 × UID), AS4:AS2 + 3 = 1, sternal vestiture sparse, S2-S4 with branched hair across sternites, forewings with 2nd r-m weaker than 1st r-m.

Description of female. Body length 4.16-4.70 mm (\bar{x} =4.44 mm, SD=0.17, n=10), head width 1.48-1.53 mm (n=10), forewing length 0.99-1.08 mm (\bar{x} =1.03 mm, SD=0.03, n=10). Relative dimensions: HW 100, HL 74-75, UID 60-61, LID 63-65, AOD 19-20, IAD 14-16, OAD 31-32, IOD 21-22, OOD 14-15, CL 15-17, GW 18-19, EW 25-26, SL 31-32, FL 65-68.

Structure. Head broad, inner orbits diverging below, median frontal carina not reaching median ocellus, eyes with a sparse cover of minute setae. Scape not reaching median ocellus. Clypeus conspicuously short and broad (CL 0.26 × LID), flat, set at distinct angle to contours of frons and supraclypeal area, surface smooth, impunctate and shining, several weak transverse striae along anterior margin, ventral margin with two widely-separated (1.9 × greater than IAD), narrow, rounded, laterally directed processes (fig. 7E), supraclypeal area slightly raised, smooth and impunctate. Frons (fig. 70A) weakly striate/punctate above antennal bases, sculpture laterally weakly punctate, extends vertically well short of anterior margin of lateral ocelli. Labrum (fig. 70B) basal area small, median area smooth and not raised, except anterior median margin

slightly raised, distal process triangular in shape except broadly truncate apically, process widest at base, median keel reduced, restricted to basal third of process, lateral ridges absent, setae not present across distal margin, distal setae originate submarginally, lateral teeth absent. Pronotum dorsolateral angles acute, well projected, lateral vertical surface with several deep grooves. Mesoscutum (fig. 70C) anterior margin rounded, punctation fine, entire surface smooth and highly polished, sparsely punctate with minute punctures, parapsidal line barely impressed. Scutellum 1.1 × longer than dorsal surface of propodeum, surface weakly convex, smooth, impunctate and highly polished. Dorsal surface of propodeum (fig. 70C) defined by posterolateral carinae set well below dorsal level, posterovertical carinae extend to dorsal carinae, dorsal sculpture rugulose with a few striae laterally, sculpture almost reaches rim mesially, dorsal rim smooth and polished. T1 closely to densely punctate except posterior marginal area impunctate. Mesepisternum upper third and metepisternum finely roughened, remainder of mesepisternum smooth, polished and impunctate. Fore tibial spur fan-shaped; BP rounded.

Colour. Head and mesosoma dark brown to black, metasoma light red-brown, T1 with large brown mesial patch, mandibles amber, red-brown apically, clypeus light brown, antennal flagellum brown above, light brown underneath, legs with apical third to half of femora, tibiae and tarsi light amber-brown, remainder of legs brown.

Vestiture. Body sparse, lower frons and paraocular areas with conspicuous cover of semi-addressed, minutely plumose hair, not forming a mat, mesoscutum almost glabrous, metasoma sparsely setose, weak lateral tomentum on T2 and T3.

Description of male. Body length 3.46-3.93 mm (\bar{x} =3.69 mm, SD=0.17, n=10), head width 1.20-1.25 mm (n=10), forewing length 0.82-0.92 mm (\bar{x} =0.87 mm, SD=0.03, n=10). Relative dimensions: HW 100, HL 77-78, UID 60-61, LID 55-56, AOD 15-16, IAD 16-17, OAD 31-32, IOD 24-25, OOD 14-15, CL 14-15, GW 16-18, EW 33-35, ML 46-48, SL 27-28, FL 110-112.

Structure. Head broad, inner orbits weakly converging below, eyes with sparse cover of minute setae, median frontal carina and scape not reaching median ocellus, clypeus flat, set at distinct angle to contours of frons, anterior half yellow, remainder dark brown, supraclypeal

area flat; labrum distal process same shape as in female, large, truncate, short median keel only, distal setae originate in from margin (fig. 21C). Antennae moderately long (FL 1.84 × UID), AS4:AS2 + 3 = 1. Remainder similar to female, frons finely striate, pronotum dorsolaterally rounded, well projected, vertical surface with several large grooves, mesoscutum smooth and highly polished, almost impunctate except with a few sparse, minute punctures, scutellum polished, impunctate, dorsal surface of propodeum not defined by posterolateral carinae, dorsal sculpture weakly rugulose on basal half only, remainder with a dull sheen, covered with fine reticulate pattern; colour of head and mesosoma dark brown, metasoma brown except mandibles, labrum and clypeus (as above) yellow, antennal scape suffused with dull yellow, flagellum light yellow-brown underneath, legs light yellow-brown except coxae dark brown, mid and hind femora suffused with brown; forewings with 2nd r-m weaker than 1st r-m.

Vestiture. Lower frons, paraocular areas, clypeus and supraclypeal area with short, adpressed, plumose hair forming a mat, mesoscutum with cover of short, adpressed and erect, minutely branched hair, mesoventral area hair short, simple and adpressed, metasomal tomentum absent; sternal vestiture sparse, S2-S4 with sparse rows with branched hair across sternites, S5 and S6 with some simple, adpressed hair.

Genitalia and associated sterna (figs 70E-H). Gonobase sides flanged basally, gonocoxite without setae, gonostyli long, apically setose with branched hair, retrorse lobes setose, well developed, ventral flanges present; S8 median process apically broadly rounded and setose, S7 median process rounded and setose apically.

Distribution (fig. 70D). Eyrean province in central South Australia, southwestern Queensland and central western New South Wales.

Etymology. The epithet *clypeatum* refers to the unusual presence of tooth-like processes on the clypeus.

Floral Forage Record. Families visited=5. Catch total=5; Fabaceae (1 catch), Myoporaceae (1), Myrtaceae (1), Proteaceae (1), Sterculiaceae (1). Genera visited=5; *Acacia* (1), *Brachychiton* Schott & Endl. (1), *Eremophila* (1), *Eucalyptus* (1), *Hakea* (1).

Flight Phenology.

3 0 0 0 1 0 0 1 0 4 0 0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Remarks. *Lasioglossum clypeatum* demonstrates a number of unique or unusual character states which include: the inner orbits diverging below the head and those of the male converging weakly; the labrum shape, the position of its distal setae and its median keel not reaching distal margin; pronotum with vertical surfaces grooved; and, highly polished mesoscutum sculpture. Unique characters include the tooth-like processes on the anterior margin of the clypeus (female only) and the shape, size and structure of the labrum of the male. Several males show macrocephalic development.

Lasioglossum (Chilalictus) cognatum (Smith)

Figures 17C, 19B, 19D, 25E, 25F, 27F, 71A-H

Halictus cognatus Smith, 1853: 59.

Halictus inclinans Smith, 1879: 36. syn. nov.

Halictus haematostoma Cockerell, 1914a: 506. syn. nov.

Halictus subinclinans Cockerell, 1915a: 8-9. syn. nov.

Lasioglossum (Chilalictus) cognatum. — Michener, 1965: 175.

Lasioglossum (Chilalictus) inclinans. — Michener, 1965: 176.

Lasioglossum (Chilalictus) haematostoma. — Michener, 1965: 176.

Lasioglossum (Chilalictus) subinclinans. — Michener, 1965: 177.

Material examined. Holotype of *cognatus*. ♂, Tasmania (as Van Dieman's Land), BM Type Hym 17.a.900 (BMNH, missing head, right fore and mid legs, hind legs and metasoma glued to card.)

Holotype of *inclinans*. ♀, Western Australia, Champion Bay (28°46'S, 114°36'E), (label reads "Australia"), BM Type Hym 17.a.908 (BMNH, missing distal nine left flagellar segments.)

Holotype of *haematostoma*. ♂, Victoria, Windsor (37°52'S, 144°59'E), French, 196, USNM Type No. 58165 (USNM, missing left antenna, right flagellum and right mid leg, head glued to card and glue covers the entire head.)

Holotype of *subinclinans*. ♀, Tasmania, Launceston (41°26'S, 147°08'E), 15 Feb 1914, collection F.M. Littler, 2568, USNM Type No. 58175 (USNM, missing distal five flagellar segments of left antenna.)

Other specimens examined (763♀♀, 357♂♂). Queensland: Goondiwindi, Inglewood, Rathdowney, Warwick, Eulo, Cunnamulla, Leyburn, Yowah, Thargomindah, Moonie, Helidon, St Ruth, Jondaryan, Kihee, Glenmorgan, Mt Kiangarow, Charleville, Roma, Quilpie, Morven, Thylungra, Windorah, Bundaberg, Blackall, Moura, Bedourie, Boulia, Longreach, Middleton, Prairie, Mt Isa.

New South Wales and Australian Capital Territory: Conargo, Canberra, Jerilderie, Browning, Goulburn,

Cootamundra, Hay, Young, Wentworth, Booligal, Blacktown, Bathurst, Broken Hill, Parkes, Menindee Lakes, Muswellbrook, Warren, Broken Hill, Scone, Trangie, Mendooran, Gilgandra, Nyngan, Wilcannia, Cobar, Coonabarabran, Mootwingee Nat. Pk, Fowlers Gap Res. Stn, Gunnedah, Tilpa, Byrock, Narrabri, Bourke, Glen Innes, Moree, Tibooburra, Legume.

Victoria: Frankston, Nelson, Melbourne, Dunkeld, Clarkefield, Grampians, Glenrowan, Wilkur, Gunbower, Birchip, Kerang, Swan Hill.

Tasmania: Dunalley, Hobart, Cambridge, Launceston, St Helens, Devonport, George Town.

South Australia: West Beach, Naracoorte, Coorong Nat. Park, Keith, Clayton, Normanville, Monarto, Belair, Adelaide, Athelstone, Birdwood, Sandy Creek, Wild Horse Plains, Murray River, Golden Grove, Port Wakefield, Morgan, Kulpara, Lock, Pt Germein, Kyancutta, Lyndhurst, Orroroo, Wilmington, Port Augusta, Quorn, Mingary, Lake Torrens, Martins Well, Wilpena, Brachina Ck, Parachilna, Roxby Downs, Broughams Gate, Moolawatana, Roxby Downs, Leigh Creek, Myrtle Springs HS, Arkaroola, Billa Kalina HS, Marree, Coward Springs, William Creek, Etadunna HS, Cullymarra Waterhole, Coongie Lakes, Amata, Kangaroo Island, Victor Harbour, Poltallock Station, Williamstown.

Northern Territory: Finke, Urandangi, Dunmarra, Borroloola.

Western Australia: Pemberton, Kojonup, Busselton, Cape Lewin, Bunbury, Lake King PO, Lake Cronin, Darlington, Merredin, Northam, Moorine Rock, Carnarvon, Newman, Millstream.

Diagnosis. Combination of wing, mesoscutal punctation and colour characters unique. Both sexes with head and propodeum black, mesoscutum and scutellum shades of green to blue. Female with frons reticulate, mesoscutum punctation moderately coarse, surface dull, dorsal surface of propodeum ruguloso-striolate, defined by weak posterolateral carinae, forewing with 1st m-cu entering third submarginal cell. Male with antennae short, AS4 shorter than AS2+3, S2 with raised, mesial process, process smooth sided, truncate, with at least 6 lateral spines, hair on S3-S5 forming inverted V shape, forewing with 2nd r-m weaker than 1st r-m.

Description of female. Body length 5.62-6.93 mm (\bar{x} =6.39 mm, SD=0.33, n=10), head width 1.76-1.91 mm (n=10), forewing length 1.41-1.64 mm (\bar{x} =1.55 mm, SD=0.06, n=10). Relative dimensions: HW 100, HL 84-86, UID 63-64, LID 56-58, AOD 17-18, IAD 12-13, OAD 30-32, IOD 20-22, OOD 17-18, CL 18-20, GW 18-19, EW 25-26, SL 33-35, FL 59-63.

Structure. Head broad, inner orbits converging below, median frontal carina not reaching median ocellus, eyes sparsely covered with min-

ute setae. Scape reaching anterior margin of median ocellus. Clypeus short (CL 0.34 × LID), flat except convex laterally and along ventral margin, shining on basal half, remainder dull with minute, transverse lineolation, sparse to open punctation with small, round punctures, supraclypeal area almost confluent with clypeal angle, weakly bulbous, surface dull, openly to closely punctate. Frons (fig. 71A) densely reticulate above antennal bases, sculpture laterally weakens, extends to anterior margin of lateral ocelli. Labrum (fig. 71B) basal median area raised to distal margin, nodulated, anterior margin rounded mesially, distal process not widest at base, distally flanged, median keel extends beyond distal margin, lateral ridges curved, dorsally smooth, almost extend to margin, distal margin setose, lateral teeth absent. Pronotum dorsolaterally rounded, weakly projected. Mesoscutum (fig. 71C) anterior margin with weakly bilobed mesial projection, punctation moderately coarse, surface dull, anteriorly with fine transverse lines, along midline and in parapsidal areas densely punctate, openly to closely punctate mesially. Scutellum 1.3 × longer than dorsal surface of propodeum, surface dull, openly to closely punctate. Dorsal surface of propodeum (fig. 71C) defined by weak posterolateral carinae set well below dorsal level, posteroverical carinae extend to dorsal carinae, dorsal sculpture ruguloso-striolate mesially, striolate laterally, sculpture almost reaches dorsal rim. T1 densely punctate. Mesepisternum and metepisternum striate. BP rounded; Fore basitarsi apically with process almost length of adjacent tarsal segment (fig. 17C); forewing with 1st m-cu entering third submarginal cell, M+Rs vein strong to entry point of 1st recurrent vein (fig. 19B).

Colour. Head and propodeum black except mandibles red-brown apically, basal half of clypeus and supraclypeal area green/blue with tinge of gold; mesoscutum and scutellum shades of green to blue, along midline and parapsidal lines tinged with gold; metasoma dark brown to black; legs brown to dark brown.

Vestiture. Body sparse, paraocular areas and frons with short, adpressed, branched hair, hair on frons almost simple, mesoscutum with erect, weakly, branched hair, lateral tomentum on T2, across T3 and T4.

Description of male. Body length 4.00-6.08 mm (\bar{x} =5.15 mm, SD=0.63, n=10), head width 1.34-1.93 mm (n=10), forewing length 1.01-1.48 mm (\bar{x} =1.26 mm, SD=0.12, n=20).

Relative dimensions: HW 100, HL 88-89, UID 66-67, LID 46-48, AOD 15-16, IAD 14-15, OAD 28-30, IOD 21-23, OOD 19-20, CL 21-23, GW 17-18, EW 32-33, ML 38-39, SL 28-29, FL 83-85.

Structure. Head elongate, inner orbits converging below, eyes appear bare, few minute setae, clypeus with pale yellow marking on at least basal half, sculpture similar to female except clypeus almost impunctate. Antennae short (FL 1.27 × UID), AS4:AS2+3=0.6. Remainder of body similar to female but with mesoscutum and scutellum surfaces shining, mesoscutum openly punctate, scutellum sparsely punctate, dorsal surface of propodeum not defined by carinae, fore basitarsi not extended, S2 with conspicuously raised, median process, process smooth sided, truncate, with 6 lateral spines (figs 25E, 25F); forewing with 2nd r-m weaker than 1st r-m (fig. 19D).

Vestiture. Body sparse, frons, paraocular areas, supraclypeal area, basal two-thirds of clypeus with dense, short, branched, adpressed hair forming a mat, mesoscutum, covered with erect, branched hair; S3-S5 with posteriorly directed, plumose hair forming inverted V-shape (fig. 27F).

Genitalia and associated sterna (figs 71E-H). Gonobase sides slightly narrowed basally, gonocoxite without setae, gonostyli setae short, both branched and simple hair present, apically with several stout, elongate spine-like setae, retrorse lobes setose, well developed, ventral flanges present; S8 median process apically rounded, with a few simple setae, S7 median process apically rounded, glabrous.

Distribution (fig. 71D). Throughout much of Australia, including Cape York Peninsula, Northern Territory and northeast Western Australia but not the Torresian province areas of north Queensland. In southern Australia, the species distribution follows the eastern zone only of the Bassian province.

Flight Phenology.

34	14	11	5	2	0	0	1	30	58	73	47
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Floral Forage Record. Families visited = 35. Catch total = 164; Aizoaceae (3 catches), Anacardiaceae (4), Brassiaceae (1), Boraginaceae (2), Brunoniaceae (1), Campanulaceae (24), Chenopodiaceae (1), Combretaceae (1), Compositae (12), Convolvulaceae (2), Cruciferae (5), Dilleniaceae (1), Fabaceae (8), Frankeniaceae (2), Goodeniaceae (4), Labiatae (2), Liliaceae

(2), Menyanthaceae (1), Myoporaceae (7), Myrtaceae (48), Oxalidiaceae (4), Papaveraceae (1), Pittosporaceae (1), Plumbaginaceae (2), Polygonaceae (1), Primulaceae (1), Proteaceae (4), Resedaceae (1), Rhamnaceae (1), Rosaceae (2), Santalaceae (1), Sapindaceae (3), Scrophulariaceae (9), Solanaceae (1), Zygophyllaceae (2). Genera visited = 63; unidentified genus of Compositae (1), *Acacia* (2), *Anthirrhinum* Moench (1), *Argemone* L. (1), *Argyranthemum* Webb ex Sch. Bip. (1), *Asphodelus* L. (1), *Atalaya* (3), *Borago* L. (1), *Brassica* (1), *Brunonia* Sm. (1), *Bulbine* v. Wolf (1), *Bursaria* (1), *Cakile* Mill. (2), *Calystegia* R.Br. (2), *Calytrix* (1), *Carpobrotus* (2), *Chrysanthemum* L. (1), *Coreopsis* L. (1), *Cotinus* Mill. (1), *Crotalaria* L. (3), *Eremophila* (7), *Eucalyptus* (38), *Frankenia* (2), *Geum* (1), *Goodenia* (2), *Grevillea* (1), *Hakea* (3), *Harmsiodoxa* O.E. Schultz (1), *Helichrysum* (2), *Heliotropium* L. (1), *Hibbertia* (1), *Jacksonia* (1), *Leptospermum* (2), *Limonium* Mill. (2), *Melaleuca* (7), *Mesembryanthemum* (1), *Muehlenbeckia* Mesinn. (1), *Myriocephalus* (1), *Nitraria* (1), *Nymphoides* Seguiet (1), *Oxalis* L. (4), *Potentilla* L. (1), *Prostanthera* (1), *Psoralea* L. (1), *Pultenaea* (1), *Rapistrum* Crantz. (1), *Reseda* L. (1), *Salsola* (1), *Samolus* L. (1), *Santalum* L. (1), *Schinus* (3), *Senecio* (1), *Solanum* (1), *Solidage* L. (1), *Spyridium* Fenzl. (1), *Stemodia* (7), *Taraxacum* (3), *Terminalia* (1), *Thymus* L. (1), *Velleia* (2), *Veronica* L. (1), *Wahlenbergia* (24), *Zygophyllum* (1).

Remarks. The floral foraging record of *L. cognatum* is the most diverse recorded for a species of this subgenus (visits to 35 flowering plant families representing 63 genera). Three male specimens from central New South Wales and southeastern Queensland display macrocephaly.

***Lasioglossum (Chilalictus) colonicum* (Rayment)**

Figures 11A, 72A-D

Halictus colonicus Rayment, 1953: 12-13.

Lasioglossum (Chilalictus) colonicum. — Michener, 1965: 175. **Material examined.** Holotype, ♂, Victoria, Gorae West (38°15'S, 141°30'E), 7 Feb 1951 (ANIC, missing distal three segments of left fore tarsus, last tarsal segment of mid right tarsus, last two tarsal segments of both hind tarsi.)

Other specimens examined (8♀). Victoria: Gorae West.

South Australia: Robe, Kangaroo Island.

Western Australia: Darling Ranges.

Diagnosis. Most like *L. ebeneum*, although