Supplementary Material

	Lifestyle	Calyx structure	Subcompartments present?	Visual innervation?	Specimens quantified
Xyeloidea: *Macroxyela ferruginea* ♂	solitary adults, phytophagous larvae	Doubled ovoid	no	NA	Qualitative data only
Tenthredinoidea: *Dolerus* spp.	solitary adults, phytophagous larvae	Doubled ovoid	no	no	6
Cephoidea: *Cephus spinipes* ♀, *Calameuta filiformis* ♀	solitary adults, stem-boring larvae	Doubled, slightly invaginated	2 subcompartments	NA	2
Siricoidea: *Tremex columba* ♀	solitary adults, wood-boring larvae	Doubled ovoid	no	NA	1
Xiphydrioidea: *Xiphydria maculata* ♀	solitary adults, wood-boring larvae	Doubled ovoid	no	NA	1
Orussoidea: *Orussus abietinus* ♂, *Orrusus occidentalis* ♂	solitary adults, parasitoid larvae	Doubled invaginated	?	NA	1
Stephanoidea: *Stephanus serrator* ♂	solitary adults, parasitoid larvae	Doubled invaginated	2 subcompartments	NA	1
Trigonaloidea: *Orthogonalys pulchella* ♂	solitary adults, parasitoid larvae	Doubled invaginated	2 subcompartments	NA	Qualitative data only
Proctotrupoidea: *Ropronia* sp. ♂	solitary adults, parasitoid larvae	Single invaginated	2 subcompartments	NA	Qualitative data only
Megalyroidea: *Megalyra* sp. ♂	solitary adults, parasitoid larvae	Doubled invaginated	2 subcompartments	NA	1
Ceraphronoidea: *Megaspilus* sp. ♂	solitary adults, parasitoid larvae	Doubled invaginated	2 subcompartments	NA	1
[12]Evanioidea: *Gasteruption* sp.	solitary adults, parasitoid larvae	Doubled invaginated	yes, lip and collar	yes	2
Chalcidoidea: *Leucospis* sp.	solitary adults, parasitoid larvae	Single invaginated	yes, lip and collar	yes	2
Ichneumonoidea: *Ophion* sp. and Ichneumonidae spp.	solitary adults, parasitoid larvae	Doubled invaginated	yes, lip, collar and basal ring	yes	4
Chrysidoidea: Chrysididae spp.	solitary adults, parasitoid larvae	Doubled invaginated	yes, lip, collar and basal ring	yes	2
[1]Apoidea: *Osmia*	solitary foragers	Doubled invaginated	yes, lip, collar and basal ring	NA	

[2]Apoidea: *Apis, Bombus*	eusocial foragers	Doubled invaginated	yes, lip, collar and basal ring	yes	
[3]Vespoidea: Masarinae	solitary foragers	Doubled invaginated	yes, lip, collar and basal ring	NA	
[3]Vespoidea, Eumeninae	solitary or presocial foragers	Doubled invaginated	yes, lip, collar and basal ring	NA	
[3]Vespoidea, Stenogastrinae	facultatively eusocial foragers	Doubled invaginated	yes, lip, collar and basal ring	NA	
[4]Vespoidea, Vespinae	eusocial foragers	Doubled invaginated	yes, lip, collar and basal ring	yes	
[5]Vespoidea, Formicidae: *Tetramorium caespitum*	eusocial foragers	Doubled invaginated	yes, lip, collar and basal ring	yes	3

Supplementary Table 1. Life history traits and mushroom body morphologies of Hymenoptera. Species include those surveyed in the present account and in the published literature (footnotes 1-5). Calyx subcompartments are denoted by name (lip, collar and basal ring) only in the Aculeata and in parasitoid species for which dextran fill data is available. 1. Withers et al 2008. 2. Gronenberg 2001; Ehmer & Gronenberg 2002; Paulk & Gronenberg 2008. 3. Ehmer & Hoy 2000. 4. Ehmer & Hoy 2000; Gronenberg 2001. 5. Gronenberg & Hölldobler 1999; Gronenberg 2001.