

Apis													
wkB1	+	+	+	+									+
P54G	+	+	+	+									+
wkB7	+	+	+	+		+							+
M6-3G	+	+	+	+	+			+					
M1-2G		+	+	+	+	+		+					
P62G		+	+	+	+	+		+					
P83G		+	+	+	+	+		+					
wkB308		+	+	+	+	+							
wkB292		+	+	+	+	+							
wkB72		+	+	+	+	+							+
wkB195		+	+	+	+	+							+
wkB112		+											+
wkB178		+						+				+	
wkB108		+	+	+	+	+			+		+		
wkB171		+	+	+	+	+							
Gris1-4	+	+		+	+	+							
Imp1-6	+	+		+	+	+							
Bombus													
Imp1-1		+											
Choc5-1		+			+								+
GillExp13		+	+		+								
App6-5		+											
Occ4-3		+											
Bif1-4		+											
Bim1-2		+											

Fig. S1 The presence (“+”) of 11 mannose-family phosphotransferase systems with Enzyme IID domains in *G. apicola* strains. These PTS may also function in the transport of sugars other than mannose, such as glucose, sorbose, fructose, and N-acetylglucosamine.

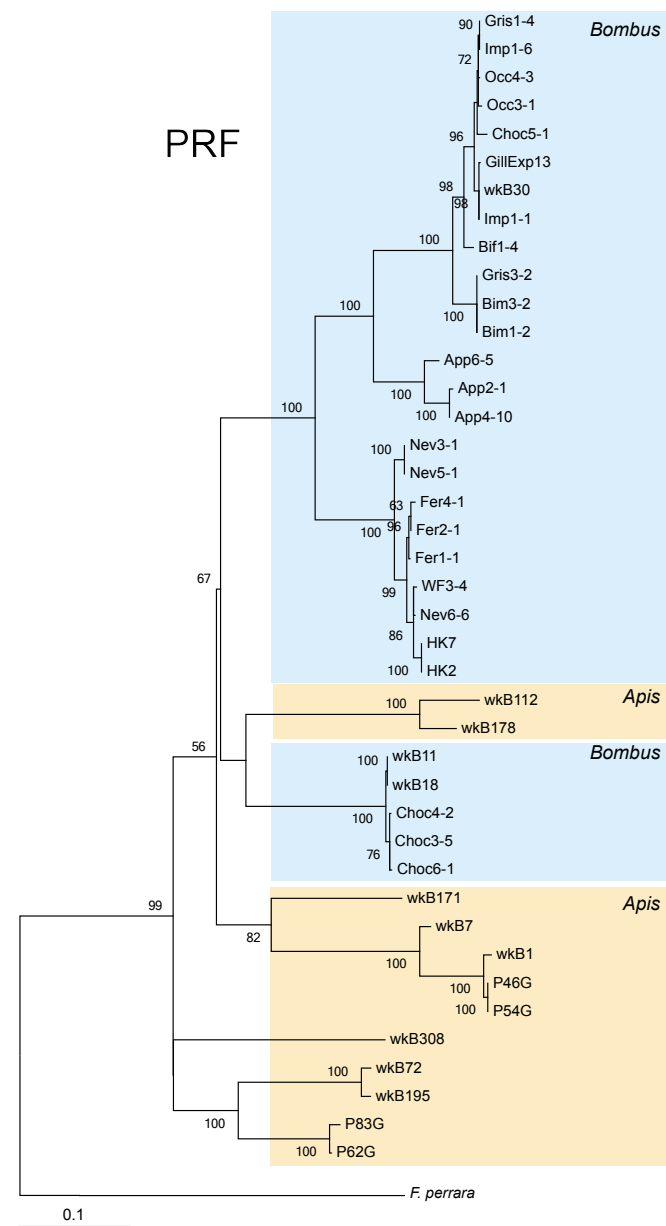
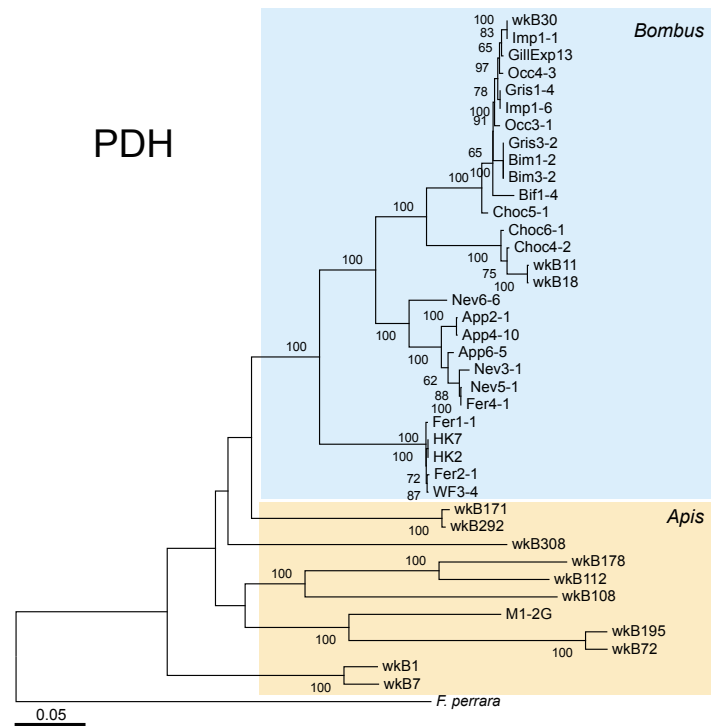


Fig. S2 Maximum-likelihood trees of the concatenated sequences of three pyruvate dehydrogenase components (PDH) and the peptide release factor (PRF) of *G. apicola* strains and *Frischella perrara*. The trees are based on nucleotide sequences and were rooted using homologs from *F. perrara*. Nodes with bootstrap values >50% are marked (1,000 replicates).

		Mannose	Arabinose			Rhamnose			Xylose		PL1
		<i>manA</i>	<i>araA</i>	<i>araB</i>	<i>araD</i>	<i>rhaA</i>	<i>rhaB</i>	<i>rhaD</i>	<i>xylA</i>	<i>xylB</i>	
<i>St. appositus</i>	App2-1										
	App4-10										
	App6-5										
<i>Th. pensylvanicus</i>	HK2										
	HK7										
	WF3-4										
<i>Th. fervidus</i>	Fer1-1										
	Fer2-1										
	Fer4-1										
<i>Cu. griseocollis</i>	Gris1-4										
	Gris3-2										
<i>Pr. bifarius</i>	Bif1-4										
<i>Pr. bimaculatus</i>	Bim1-2										
	Bim3-2										
<i>Pr. impatiens</i>	Choc3-5										
	Choc4-2										
	Choc5-1										
	Choc6-1										
	GillExp13										
<i>Pr. vagans</i>	Imp1-1										
	Imp1-6										
	wkB18										
<i>Bi. nevadensis</i>	Nev3-1										
	Nev5-1										
	Nev6-6										
<i>Bo. occidentalis</i>	Occ3-1										
	Occ4-3										

Fig. S3 The presence of the genes related to the metabolism of the four sugars and the pectate lyase gene (PL1) in *G. apicola* strains isolated from bumble bee guts. Colored boxes indicate gene presence, and white boxes indicate gene absence.

Table S1. Genome features of the *Gilliamella apicola* strains isolated from honey bee and bumble bee guts.

Host genus	Host subgenus	Host species	Strain	Total size (bp)	No. of contigs	N50	Accession No.	16S rRNA similarity ^a (%)	Sequencing method	Collection location	Collection date			
<i>Apis</i>	<i>Micrapis</i>	<i>Apis andreniformis</i>	wkB171	2,670,926	59	144,296	LYST00000000	99.0	Illumina MiSeq 2×300	Hort Park, Singapore	August, 2014			
			wkB108	3,076,170	23	77,698	LZGM00000000	98.1	Illumina MiSeq 2×300	University of Malaya, Kuala Lumpur, Malaysia	July, 2014			
	<i>Megapis</i>	<i>Apis dorsata</i>	wkB112	2,532,308	22	293,117	LZGL00000000	97.9	Illumina MiSeq 2×300	University of Malaya, Kuala Lumpur, Malaysia	July, 2014			
			wkB178	2,369,030	16	588,434	LZGK00000000	98.9	Illumina MiSeq 2×300	Hort Park, Singapore	August, 2014			
	<i>Apis</i>	<i>Apis cerana</i>	wkB72	2,570,834	79	213,610	LZEI00000000	99.0	Illumina MiSeq 2×300	Kampung Baru Kuning Selatan, Negeri Sembilan, Malaysia	July, 2014			
			wkB195	2,500,996	38	101,351	LZGP00000000	99.0	Illumina MiSeq 2×300	Hort Park, Singapore	August, 2014			
			wkB292	2,741,181	85	98,188	LZGO00000000	99.0	Illumina MiSeq 2×300	Hort Park, Singapore	August, 2014			
			wkB308	2,737,107	46	195,029	LZGN00000000	97.2	Illumina MiSeq 2×300	Genting Highlands, Pahang, Malaysia	July, 2014			
			P54G	3,105,460	56	129,582	LZGJ00000000	99.3	Illumina MiSeq 2×250	West Haven, CT, USA	September, 2011			
		P46G	7,423,003	2,781	5,899	MCIW00000000	99.3	Illumina MiSeq 2×250	West Haven, CT, USA	September, 2011				
		P62G	2,549,106	20	172,591	LZGI00000000	99.3	Illumina MiSeq 2×250	West Haven, CT, USA	September, 2011				
		P83G	2,494,021	29	230,310	LZGH00000000	99.1	Illumina MiSeq 2×250	West Haven, CT, USA	July, 2014				
		wkB7	2,901,642	1	2,901,642	LZGG00000000	99.6	PacBio RSII, Illumina MiSeq 2×250	West Haven, CT, USA	September, 2011				
		M1-2G	2,388,823	10	342,893	LZGQ00000000	99.0	Illumina MiSeq 2×250	West Haven, CT, USA	May, 2011				
	M6-3G	2,700,722	83	191,995	MCIU00000000	98.9	Illumina MiSeq 2×250	University of Texas, Austin, TX, USA	February, 2014					
	<i>Bombus</i>	<i>Subterraneobombus</i>	<i>Bombus appositus</i>	App2-1	2,418,433	73	71,484	LZGR00000000	98.1	Illumina MiSeq 2×300	East of Logan along Hwy 89, Utah, USA	July, 2014		
				App4-10	2,434,386	53	145,820	LZGS00000000	98.1	Illumina MiSeq 2×300	East of Logan along Hwy 89, Utah, USA	July, 2014		
				App6-5	2,633,935	106	66,665	LZGT00000000	98.6	Illumina MiSeq 2×300	East of Logan along Hwy 89, Utah, USA	July, 2014		
				<i>Thoracobombus</i>	<i>Bombus pensylvanicus</i>	HK2	2,843,330	117	79,103	LZGV00000000	98.8	Illumina MiSeq 2×250	Brackenridge Field Lab, Austin, Texas, USA	June, 2013
						HK7	2,832,078	137	59,720	LZGU00000000	98.5	Illumina MiSeq 2×250	Brackenridge Field Lab, Austin, Texas, USA	June, 2013
WF3-4		2,847,396	61			165,092	LZGW00000000	99.0	Illumina MiSeq 2×300	Lady Bird Johnson Wildflower Centre, Austin, Texas, USA	June, 2014			
<i>Bombus fervidus</i>		Fer1-1	2,741,337	118	44,896	LZGX00000000	98.9	Illumina MiSeq 2×300	Logan, Utah, USA	July, 2014				
		Fer2-1	2,611,703	207	24,516	LZGY00000000	99.0	Illumina MiSeq 2×300	Logan, Utah, USA	July, 2014				
		Fer4-1	2,520,134	360	12,144	LZGZ00000000	98.7	Illumina MiSeq 2×300	Logan, Utah, USA	July, 2014				
		<i>Cullumanobombus</i>	<i>Bombus griseocollis</i>	Gris1-4	2,358,864	90	58,267	LZHA00000000	98.6	Illumina MiSeq 2×250	New Haven, CT, USA	June, 2013		
Gris3-2				2,552,527	89	61,124	LZHB00000000	98.6	Illumina MiSeq 2×300	New Haven, CT, USA	June, 2013			
<i>Pyrobombus</i>		<i>Bombus bifarius</i>	Bif1-4	2,551,594	98	176,528	LZHC00000000	98.8	Illumina MiSeq 2×300	East of Logan along Hwy 89, Utah, USA	July, 2014			
			Bim1-2	2,537,475	107	71,558	LZHD00000000	98.6	Illumina MiSeq 2×250	New Haven, CT, USA	June, 2013			
		<i>Bombus bimaculatus</i>	Bim3-2	2,592,778	177	37,453	LZHE00000000	98.6	Illumina MiSeq 2×300	New Haven, CT, USA	June, 2013			
			Choc3-5	2,193,011	89	74,181	LZHF00000000	97.2	Illumina MiSeq 2×250	New Haven, CT, USA	August, 2012			
		<i>Bombus impatiens</i>	Choc4-2	2,245,186	78	79,959	LZHG00000000	97.2	Illumina MiSeq 2×250	New Haven, CT, USA	August, 2012			
			Choc5-1	2,628,355	125	66,703	LZHH00000000	97.2	Illumina MiSeq 2×250	New Haven, CT, USA	August, 2012			
			Choc6-1	2,180,622	68	105,607	LZHI00000000	96.2	Illumina MiSeq 2×250	New Haven, CT, USA	August, 2012			
			GillExp13	2,392,232	163	33,677	LZHI00000000	98.7	Illumina MiSeq 2×250	New Haven, CT, USA	August, 2012			
			Imp1-1	2,359,762	141	34,994	LZHK00000000	98.7	Illumina MiSeq 2×250	New Haven, CT, USA	June, 2013			
	<i>Bombus vagans</i>	Imp1-6	2,269,603	91	45,049	LZHL00000000	98.8	Illumina MiSeq 2×250	New Haven, CT, USA	June, 2013				
wkB18		2,371,993	25	67,286	LZHM00000000	97.2	Illumina MiSeq 2×250	New Haven, CT, USA	June, 2011					
<i>Bombus nevadensis</i>		Nev3-1	2,857,512	93	106,933	LZHN00000000	98.8	Illumina MiSeq 2×300	East of Logan along Hwy 89, Utah, USA	July, 2014				
		Nev5-1	2,713,492	94	74,914	LZHO00000000	98.9	Illumina MiSeq 2×300	East of Logan along Hwy 89, Utah, USA	July, 2014				
<i>Bombus</i>	<i>Bombus occidentalis</i>	Nev6-6	2,689,628	103	70,613	LZHP00000000	99.4	Illumina MiSeq 2×300	East of Logan along Hwy 89, Utah, USA	July, 2014				
		Occ3-1	2,232,791	36	101,835	LZHQ00000000	98.8	Illumina MiSeq 2×300	East of Logan along Hwy 89, Utah, USA	July, 2014				
		Occ4-3	2,686,218	124	56,684	LZHR00000000	98.6	Illumina MiSeq 2×300	East of Logan along Hwy 89, Utah, USA	July, 2014				

^aThe 16S rRNA sequences of *G. apicola* strains were compared to that of strain wkB1.