



Fig. S1. Honeybee specimen of *Apis mellifera ligustica*.

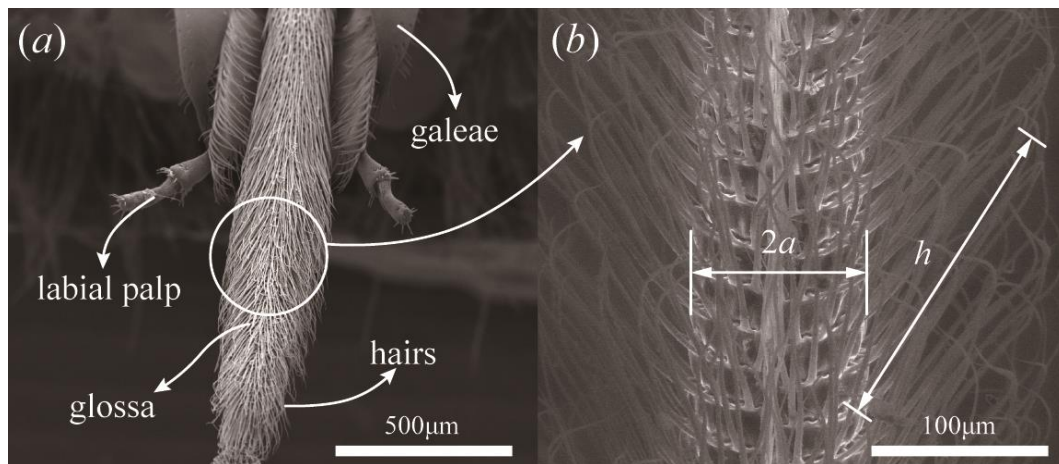


Fig. S2. The honeybee's mouthpart. (a) The mouthpart consists of a pair of labial palpi, a pair of galeae and a glossa covered by dense hairs. (b) The enlarged part of a typical glossa with bushy hairs. We measured and averaged lengths of the glossal hairs in Regions I-III. The lengths of the glossal hairs are $109.47 \pm 8.96 \mu\text{m}$, $110.57 \pm 5.97 \mu\text{m}$, $126.61 \pm 13.73 \mu\text{m}$, respectively.

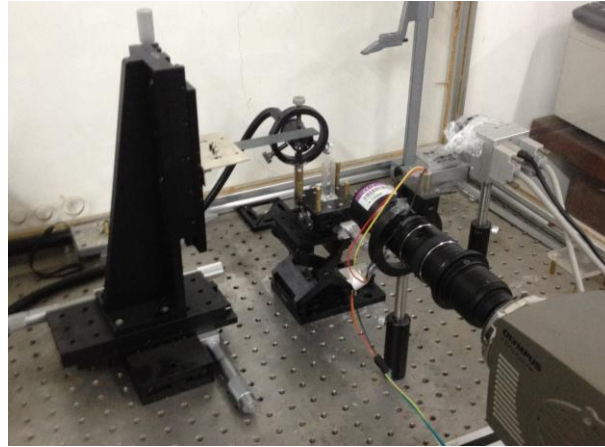


Fig. S3. The experimental setup

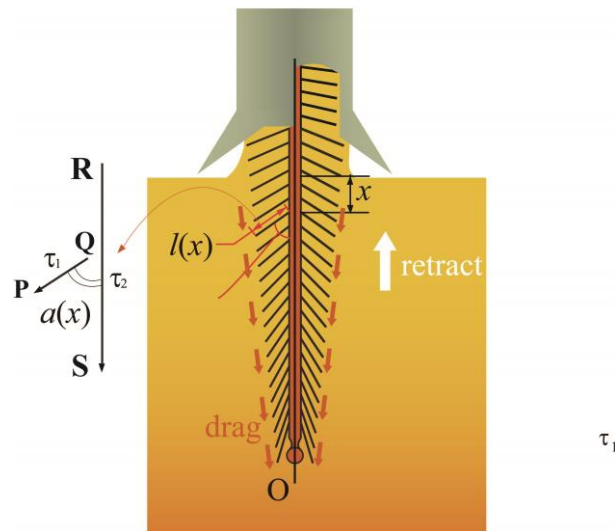


Fig. S4. Calculation method of the erection angle.



Movie 1. Dipping behaviour of a honeybee.

Table S1. Data of erection angles measured from high-speed images and then converted to real sizes

t / ms	Part A		Part B		Part C		Part D		Part E		Part F	
	Ave.	St. Dev	Ave.	St. Dev	Ave.	St. Dev	Ave.	St. Dev	Ave.	St. Dev	Ave.	St. Dev
0	5.00	0.00	0.00	0.00	0.00	0.00	5.00	0.41	0.00	0.00	0.00	0.00
1	10.08	1.81	0.00	0.00	0.00	0.00	10.30	0.93	0.00	0.00	0.00	0.00
2	11.00	1.23	0.00	0.00	0.00	0.00	11.36	0.14	3.78	0.06	0.00	0.00
3	18.48	0.22	3.00	0.00	0.00	0.00	18.11	1.65	13.24	0.16	0.00	0.00
4	24.62	0.99	5.00	0.00	0.00	0.00	28.21	1.78	18.25	0.91	0.00	0.00
5	26.22	1.54	9.00	0.00	0.00	0.00	28.19	0.28	15.52	1.49	0.00	0.00
6	28.44	1.23	14.04	0.00	0.00	0.00	31.41	0.87	16.00	0.54	0.00	0.00
7	29.48	0.97	14.62	0.00	0.00	0.00	32.79	1.79	16.76	0.98	0.00	0.00
8	30.98	0.61	16.50	0.00	0.00	0.00	32.11	3.07	16.60	0.37	0.00	0.00
9	30.45	0.30	18.43	0.00	0.00	0.00	31.47	3.04	19.15	1.44	0.00	0.00
10	30.45	0.83	19.18	0.00	0.00	0.00	32.91	0.52	19.77	0.50	0.00	0.00
11	30.65	1.76	19.65	0.00	0.00	0.00	30.96	3.01	21.37	1.08	0.00	0.00
12	31.61	1.68	20.32	0.00	0.00	0.00	32.28	3.09	22.25	1.56	0.00	0.00
13	30.65	1.00	21.04	0.00	0.00	0.00	31.57	1.53	21.04	1.87	0.00	0.00
14	31.61	1.67	21.04	0.00	0.00	0.00	32.68	2.62	21.38	2.05	0.00	0.00
15	31.83	0.90	20.77	0.00	0.00	0.00	32.01	0.45	20.22	1.11	0.00	0.00
16	32.20	0.48	21.45	0.00	0.00	0.00	31.33	1.32	22.83	0.32	0.00	0.00
17	31.61	1.76	21.20	0.27	0.00	0.00	32.55	2.98	22.25	0.33	0.00	0.00
18	32.62	1.89	23.11	0.41	0.00	0.00	32.97	2.61	23.75	0.61	0.00	0.00
19	30.96	1.17	23.43	0.26	0.00	0.00	32.47	3.12	23.50	1.98	0.00	0.00
20	31.83	0.18	24.15	0.53	0.00	0.00	31.76	2.08	23.97	0.61	0.00	0.00
21	31.83	1.42	22.93	1.89	0.00	0.00	33.02	0.12	23.76	1.93	0.00	0.00
22	30.38	3.38	21.80	1.05	0.00	0.00	32.70	2.78	24.62	0.60	0.00	0.00
23	31.26	3.34	22.48	0.95	0.00	0.00	32.26	3.01	25.56	2.38	0.00	0.00
24	31.61	4.03	22.75	0.81	0.00	0.00	33.07	2.24	25.46	0.89	0.00	0.00
25	32.18	3.97	22.75	0.52	0.00	0.00	34.45	2.61	25.99	0.51	0.00	0.00

Table S2. Contact angles at different regions of the bee tongue

concentration	A		B		C		D		E		F	
	Ave.	St. Dev	Ave.	St. Dev	Ave.	St. Dev	Ave.	St. Dev	Ave.	St. Dev	Ave.	St. Dev
25%	55.55	0.70	48.20	1.20	41.95	0.90	51.94	0.70	49.23	0.40	36.91	0.70
35%	43.49	0.50	38.50	0.30	35.20	0.30	41.25	0.50	35.77	0.80	32.30	0.60
45%	42.02	0.50	36.82	0.80	29.21	0.50	35.74	0.30	31.6	0.40	24.70	1.00