Supplementary data:

Table S1. Measurements of various taxonomic characters and indices for *O. parvidens* of district Buner during, 2016-19.

S. no.	Parameters	O-R (min-Max)	Range in literature	Mean	SD	SE	CV
1	Length of left mandible from the base	1.19-1.4	1.19-1.38	1.29	0.06	0.02	4.64
2	Length of tooth to apical tip	0.75-0.89	0.70-0.90	0.83	0.04	0.01	4.50
3	Length of head to side base of mandible	2.2-2.89	1.89-2.70	2.54	0.18	0.05	7.26
4	Max. Length of head with mandible	3.49-4.2	-	3.84	0.21	0.06	5.39
5	Head width max	1.28-2.26	1.45-2.15	1.98	0.22	0.06	11.01
6	Width of pronotum	1.34-1.7	1.05-1.65	1.51	0.13	0.04	8.67
7	Length of pronotum	0.59-0.93	0.60-0.93	0.80	0.08	0.02	10.00
8	Postmentum max width	0.66-0.9	0.62-0.90	0.82	0.05	0.01	6.48
9	Postmentum min length	1.28-1.89	1.15-1.70	1.57	0.19	0.05	12.44
10	Total body length	0-0	5.30 -7.45	0.00	0.00	0.00	0
11	Mandible Head Index (Length of mandible/length of head)	0.45-0.51	0.50-0.60	0.51	0.04	0.01	7.56
12	Index tooth distance/mandible length	0.62-0.67	0.58-0.65	0.64	0.03	0.01	4.49

Table S2. Measurements of various taxonomic characters and indices for *O. parvidens* of district Swabi during, 2016-19.

S. No.	Parameters	O-R(min-Max)	Range in literature	Mean	SD	SE	CV
1	Length of left mandible from the base	1.19-1.4	1.19-1.38	1.29	0.08	0.02	6.50
2	Length of tooth to apical tip	0.8-0.89	0.70-0.90	0.83	0.03	0.01	3.66
3	Length of head to side base of mandible	2.35-2.61	1.89-2.70	2.49	0.08	0.02	3.60
4	Max. Length of head with mandible	3.54-3.99	-	3.79	0.13	0.03	3.62
5	Head width max	1.8-2.26	1.45-2.15	2.02	0.17	0.04	8.62
6	Width of pronotum	1.34-1.69	1.05-1.65	1.45	0.13	0.03	9.42
7	Length of pronotum	0.65-0.93	0.60-0.93	0.81	0.08	0.02	10.41
8	Postmentum max width	0.77-0.88	0.62-0.90	0.81	0.03	0.01	3.99
9	Postmentum min length	1.28-1.65	1.15-1.70	1.49	0.15	0.04	10.61
10	Total body length	0-0	5.30 -7.45	0	0	0	0
11	Mandible Head Index (Length of mandible/ length of head)	0.45-0.51	0.50-0.60	0.51	0.03	0.01	6.47
12	Tooth index (tooth distance to tip/mandible Length)	0.65-0.67	0.58-0.65	0.64	0.03	0.01	5.42

Table S3. Measurements of various taxonomic characters and indices for *O. obesus* of district Buner during, 2016-19.

S. No.	Parameters	O-R (min-max)	Range in literature	Mean	SD	SE	CV
1	Number of Antennal segments	16-17	16-17				
2	Max. Length of left mandible from the base	0.69-0.9	0.75-1.03	0.81	0.07	0.03	8.09
3	Length of tooth to apical tip	0.14-0.35	0.25-0.38	0.26	0.06	0.03	24.22
4	Length of head to side base of mandible	1.18-1.59	1.03-1.67	1.36	0.12	0.06	9.17
5	Max. Length of head with mandible	1.91-2.37	-	2.16	0.18	0.08	8.13
6	Min head width	0.56-0.92	-	0.76	0.08	0.04	10.99
7	Max head width	1.05-1.36	0.95-1.37	1.21	0.10	0.05	8.65
8	Width of pronotum	0.88-1.1	0.80-1.07	1.00	0.08	0.03	7.79
9	Length of pronotum	0.52-0.66	0.50-0.65	0.59	0.05	0.02	7.95
10	Postmentum width	0.48-0.62	0.50-0.58	0.57	0.04	0.02	7.75
11	Postmentum length	0.7-1.05	0.70-0.93	0.94	0.09	0.04	9.99
12	Total body length	0-0	4.0-6.0	0	0	0	0
13	Head Index (Width/Length)	0.80-0.95	0.82-0.95	0.89	0.06	0.03	6.27
14	Mandible Head Index (Length of mandible/ length of head)	0.48-0.63	0.59-0.68	0.59	0.06	0.03	10.11
15	Head-convergence index (min. width of head/max. width of head)	0.53-0.71	0.62-0.70	0.65	0.08	0.04	13.15
16	Index tooth-distance/mandible-Length	0.24-0.39	0.31-0.40	0.31	0.06	0.03	18.84

Table S4. Measurements of various taxonomic characters and indices for *O. obesus* of district Haripur during, 2016-19.

S. No.	Parameters	O-R (min-max)	Literature range	Mean	SD	SE	CV
1	Number of Antennal segments	16-17	16-17				
2	Max. Length of left mandible from the base	0.65-1.02	0.75-1.03	0.82	0.12	0.05	14.40
3	Length of tooth to apical tip	0.21-0.38	0.25-0.38	0.30	0.06	0.03	18.94
4	Length of head to side base of mandible	1.18-1.5	1.03-1.67	1.33	0.09	0.04	7.10
5	Max. Length of head with mandible	1.89-2.49	-	2.15	0.20	0.09	9.44
6	Min. head width	0.65-0.91	-	0.80	0.07	0.03	9.14
7	Max. head width	1-1.35	0.95-1.37	1.20	0.10	0.04	8.09
8	Width of pronotum	0.8-1.35	0.80-1.07	0.93	0.11	0.05	11.60
9	Length of pronotum	0.5-0.7	0.50-0.65	0.58	0.05	0.02	9.18
10	Postmentum width	0.49-0.69	0.50-0.58	0.58	0.05	0.02	8.83
11	Postmentum length	0.81-0.91	0.70-0.93	0.87	0.03	0.01	3.36
12	Total body length	0-0	4.0-6.0	0.00	0.00	0.00	0.00
13	Head Index (Width/Length)	0.67-1.083	0.82-0.95	0.91	0.10	0.05	11.31
14	Mandible Head Index (Length of mandible/ length of head)	0.50-0.73	0.59-0.68	0.62	0.06	0.03	9.57
15	Head-convergence index (min. width of head/max. width of head)	0.52-0.9	0.62-0.70	0.67	0.10	0.04	14.28
16	Index tooth-distance/mandible-length	0.25-0.55	0.31-0.40	0.36	0.05	0.02	14.79

Table S5. Measurements of various taxonomic characters and indices for *O. obesus* of district Swabi during, 2016-19.

S. No.	Measurements	O-R (min-max)	Range in literature	Mean	SD	SE	CV
1	No. antennal segments	16-17	16-17				
2	Max Length of left mandible from the base	0.7-1.02	0.75-1.03	0.854	0.103	0.046	12.070
3	Length of tooth to apical tip	0.18-0.38	0.25-0.38	0.305	0.060	0.027	19.567
4	Length of head to side base of mandible	1.22-1.56	1.03-1.67	1.381	0.082	0.037	5.956
5	Maxi Length of head with mandible	1.98-2.47	-	2.235	0.158	0.071	7.073
6	Min head width	0.68-0.9	-	0.825	0.068	0.030	8.190
7	Max head width	1.05-1.31	0.95-1.37	1.195	0.091	0.041	7.658
8	Width of pronotum	0.83-1.07	0.80-1.07	0.948	0.063	0.028	6.638
9	Length of pronotum	0.5-0.66	0.50-0.65	0.573	0.050	0.023	8.817
10	Postmentum width	0.48-0.62	0.50-0.58	0.560	0.039	0.018	7.047
11	Postmentum length	0.86-1	0.70-0.93	0.910	0.038	0.017	4.215
12	Total body length	0-0	4.0-6.0	0	0	0	0
13	Head index (width/length)	0.86-0.93	0.82-0.95	0.897	0.033	0.015	3.706
14	Mandible Head Index (Length of mandible/ length of head)	0.50-0.76	0.59-0.68	0.657	0.133	0.060	20.279
15	Head-convergence index (min. Width of head/max. Width of head)	0.65-0.74	0.62-0.70	0.692	0.047	0.021	6.737
16	Index tooth-distance/mandible-length	0.28-0.35	0.31-0.40	0.329	0.041	0.018	12.541

Table S6. Measurements of various taxonomic characters and indices for *O. horai* of district Haripur during, 2016-19.

S. no.	Parameters	O-R (min-Max)	Range in literature	Mean	SD	SE	CV
1	Number of Antennal segments	15-16	15-16				
2	Length of left mandible from the base	1-1.3	1.05-1.23	1.168	0.119	0.053	10.17
3	Length of tooth to apical tip	0.6-0.8	-	0.72	0.084	0.037	11.62
4	Length of head to side base of mandible	1.7-1.9	1.65-2.00	1.83	0.082	0.037	4.51
5	Head width max	1.35-1.55	1.28-1.65	1.47	0.076	0.034	5.16
6	Width of pronotum	0.85-1.2	0.90-1.25	1.03	0.164	0.073	15.95
7	Length of pronotum	0.6-0.7	0.55-0.75	0.666	0.042	0.019	6.33
8	Postmentum max width	0.55-0.66	0.53-0.70	0.612	0.044	0.020	7.25
9	Postmentum length	1.2-1.4	1.13-1.38	1.31	0.074	0.033	5.66
10	Width of labrum	0.27-0.29	0.26-0.33	0.282	0.008	0.004	2.97
11	Total body length	5-6	4.85-6.80	5.52	0.432	0.193	7.83
12	Head Index (Width/Length)	0.56-0.76	0.74-0.89	0.64	0.082	0.037	12.76
13	Mandible Head Index (Length of mandible/length of head)	0.55-0.76	0.55-0.65	0.64	0.082	0.037	12.76
14	Index tooth distance/mandible length	0.54-0.7	0.60-0.66	0.62	0.059	0.026	9.55

Table S7. Measurements of various taxonomic characters and indices for *O. assmuthi* of district Buner during, 2016-19.

S. No.	Parameters	O-R (min-Max)	Range in literature	Mean	SD	SE	CV
1	Number of Antennal segments	16-16	16				
2	Max. Length of left mandible from the base	0.82-0.94	0.77-0.95	0.87	0.05	0.02	5.82
3	Length of tooth to apical tip	0.28-0.33	0.28-0.35	0.30	0.02	0.01	5.90
4	Length of head to side base of mandible	1.57-1.7	1.44-1.70	1.65	0.05	0.02	2.94
5	Max. Length of head with mandible	2.45-2.57	-	2.51	0.04	0.02	1.52
6	Min. head width	0.87-0.92	0.78-0.98	0.90	0.02	0.01	1.84
7	Max. head width	1.22-1.43	1.07-1.35	1.32	0.07	0.03	5.28
8	Width of pronotum	0.9-1	0.75-0.95	0.95	0.04	0.02	4.31
9	Length of pronotum	0.53-0.73	0.48-0.58	0.61	0.07	0.03	11.36
10	Postmentum width	0.48-0.58	0.45-0.60	0.53	0.04	0.02	7.08
11	Postmentum length	0.89-1.2	0.94-1.25	1.02	0.11	0.05	10.98
12	Length of labrum	0.3-0.34	0.35	0.32	0.02	0.01	5.03
13	Width of labrum	0.31-0.35	0.3	0.33	0.02	0.01	5.07
14	Total body length	0-0	4.5-6.5	0.00	0.00	0.00	0.00
15	Mandible Head Index (Length of mandible/ length of head)	0.48-0.59	0.51-0.57	0.53	0.04	0.02	8.27
16	Head-convergence index (min. width of head/max. width of head)	0.62-0.72	0.68-0.78	0.68	0.04	0.02	5.57
17	Index tooth distance/mandible-length	0.31-0.35	0.33-0.37	0.34	0.02	0.01	4.49

Table S8. Measurements of various taxonomic characters and indices for *O. assmuthi* of district Haripur during, 2016-19.

S. No.	Parameters	O-R (min-Max)	Literature range	Mean	SD	SE	CV
1	Number of Antennal segments	15-16	16				
2	Max. Length of left mandible from the base	0.82-0.94	0.77-0.95	0.88	0.04	0.02	4.40
3	Length of tooth to apical tip	0.27-0.35	0.28-0.35	0.31	0.03	0.01	9.25
4	Length of head to side base of mandible	1.5-1.7	1.44-1.70	1.64	0.06	0.03	3.63
5	Max. Length of head with mandible	2.4-2.59	-	2.52	0.06	0.03	2.28
6	Min. head width	0.81-0.96	0.78-0.98	0.88	0.05	0.02	5.85
7	Max. head width	1.2-1.36	1.07-1.35	1.29	0.05	0.02	4.16
8	Width of pronotum	0.89-1	0.75-0.95	0.93	0.04	0.02	4.15
9	Length of pronotum	0.45-0.63	0.48-0.58	0.55	0.05	0.02	9.00
10	Postmentum width	0.5-0.6	0.45-0.60	0.55	0.03	0.01	5.43
11	Postmentum length	0.89-1.1	0.94-1.25	0.98	0.07	0.03	6.85
12	Length of labrum	0.31-0.35	0.35	0.33	0.02	0.01	4.55
13	Width of labrum	0.29-0.33	0.3	0.31	0.01	0.00	3.62
14	Total body length	0-0	4.5-6.5	0.00	0.00	0.00	0.00
15	Mandible Head Index (Length of mandible/length of head)	0.48-0.6	0.51-0.57	0.54	0.04	0.02	6.84
16	Head-convergence index (min. width of head/max. width of head)	0.61-0.75	0.68-0.78	0.68	0.04	0.02	5.87
17	Index tooth distance/mandible length	0.31-0.4	0.33-0.37	0.36	0.03	0.01	7.94

Table S9. Measurements of various taxonomic characters and indices for *O. assmuthi* of district Swabi during, 2016-19.

S. No.	Parameters	O-R (min-Max)	Range in literature	Mean	SD	SE	CV
1	Number of Antennal segments	15-16	16				
2	Max Length of left mandible from the base	0.82-0.91	0.77-0.95	0.86	0.03	0.02	3.97
3	Length of tooth to apical tip	0.27-0.34	0.28-0.35	0.30	0.03	0.01	9.43
4	Length of head to side base of mandible	1.6-1.7	1.44-1.70	1.66	0.04	0.02	2.49
5	Maxi Length of head with mandible	2.45-2.58	-	2.51	0.04	0.02	1.77
6	Min head width	0.81-0.9	0.78-0.98	0.87	0.04	0.02	4.85
7	Max head width	1.2-1.35	1.07-1.35	1.26	0.06	0.03	5.02
8	Width of pronotum	0.89-1	0.75-0.95	0.94	0.05	0.02	5.17
9	Length of pronotum	0.45-0.73	0.48-0.58	0.58	0.10	0.04	16.82
10	Postmentum width	0.5-0.57	0.45-0.60	0.55	0.03	0.01	4.75
11	Postmentum length	0.89-1.05	0.94-1.25	0.96	0.06	0.03	6.72
12	Max. Length of labrum	0.32-0.35	0.35	0.33	0.01	0.01	3.52
13	Min length of labrum	0.31-0.35	0.3	0.32	0.01	0.01	4.58
14	Total body length	0-0	4.5-6.5	0.00	0.00	0.00	0
15	Mandible Head Index (Length of mandible/ length of head)	0.48-0.55	0.51-0.57	0.52	0.03	0.01	5.29
16	Head-convergence index (min. Width of head/max. Width of head)	0.63-0.75	0.68-0.78	0.69	0.04	0.02	6.11
17	Index tooth distance/mandible length	0.31-0.37	0.33-0.37	0.35	0.02	0.01	6.41

Table. S10 Material examined for the morphometric analysis of *O. parvidens* from the studied area during, 2016-19.

S. no.	District	X	Y	Host food	Collector	Date of collection
1	Buner	72.598288	34.350171	Wood	Maid Zaman	21-v-2016
2	Buner	72.507558	34.390687	Wood	Maid Zaman	28-viii-2017
3	Buner	72.438691	34.376848	Pinus	Maid Zaman	03-vii-2016
4	Buner	72.680997	34.377715	Fig	Maid Zaman	19-vii-2016
5	Buner	72.698563	34.379714	Pinus	Maid Zaman	26-vi-2016
6	Buner	72.481359	34.424318	Pinus	Maid Zaman	13-x-2016
7	Buner	72.483517	34.445389	White mulberry	Maid Zaman	20-vii-2016
8	Buner	72.491862	34.475776	Poplar	Maid Zaman	20-ix-2016
9	Buner	72.532538	34.467296	Grasses	Maid Zaman	20-vii-2017
10	Buner	72.5197	34.501427	Acacia	Maid Zaman	01-ix-2017
11	Buner	72.683657	34.608187	Pinus	Maid Zaman	02-ix-2017
12	Buner	72.650092	34.49143	Pinus	Maid Zaman	21-viii-2017
13	Buner	72.508909	34.662834	Fig	Maid Zaman	23-ix-2016
14	Buner	72.515576	34.658635	Acacia	Maid Zaman	23-ix-2016
15	Buner	72.451019	34.573227	Paper	Maid Zaman	12-ix-2017
16	Buner	72.365302	34.435395	Fig	Maid Zaman	13-ix-2016
17	Buner	72.30477	34.599131	Pinus	Maid Zaman	17-vii-2016
18	Buner	72.505075	34.654007	Wood	Maid Zaman	17-vi-2016
19	Swabi	72.743581	34.216361	Pinus	Maid Zaman	17-v-2018
20	Swabi	72.656611	34.258759	Wheat	Maid Zaman	17-v-2018
21	Swabi	72.474971	34.147844	Acacia	Maid Zaman	17-vi-2018
22	Swabi	72.345849	34.309353	Maize	Maid Zaman	23-ix-2018
23	Swabi	72.414295	34.312894	Paper mulberry	Maid Zaman	06-v-2018

Table S11 Material examined for the morphometric analysis of *O. assmuthi* from the studied area during, 2016-19.

S. no.	District	X	Y	Host food	Collector	Date of collection
1	Haripur	72.614809	33.989073	Oranges	Maid Zaman	10-v-2018
2	Haripur	72.771031	34.037062	Wood	Maid Zaman	30-v-2018
3	Haripur	72.831308	34.007868	Wheat	Maid Zaman	31-v-2018
4	Haripur	72.874166	33.98034	Maize	Maid Zaman	01-vi-2018
5	Haripur	72.941805	33.749294	Pinus	Maid Zaman	30-vi-2017
6	Haripur	73.16339	33.893328	Pinus	Maid Zaman	04-vii-2018
7	Haripur	73.09986	33.968562	Wood	Maid Zaman	20-vii-2018
8	Haripur	72.956749	33.822599	Grasses	Maid Zaman	05-ix-2018
9	Haripur	73.025299	34.00531	Shrubs	Maid Zaman	02-v-2017
10	Haripur	72.891057	33.968977	Grasses	Maid Zaman	2-vii-2017
11	Haripur	72.948147	33.82476	Grasses	Maid Zaman	2-vii-2017
12	Buner	72.687688	34.337327	Wood	Maid Zaman	02-viii-2016
13	Buner	72.667614	34.61797	Maize	Maid Zaman	17-vi-2016
14	Buner	72.710333	34.401573	Shrubs	Maid Zaman	29-v-2016
15	Swabi	72.619775	34.071273	Grasses	Maid Zaman	27-viii-2018

Table S12 Material examined for the morphometric analysis of *O. obesus* from the studied area during, 2016-19.

S. no.	District	X	Y	Host food	Collector	Date of collection
1	Haripur	72.566476	33.973733	Acacia	Maid Zaman	10-v-2017
2	Haripur	72.631004	33.950777	Grasses	Maid Zaman	18-v-2017
3	Haripur	72.688097	33.908004	Acacia	Maid Zaman	18-v-2018
4	Haripur	72.7921	34.078432	Maize	Maid Zaman	18-v-2017
5	Haripur	72.852503	33.896306	Acacia	Maid Zaman	01-vi-2017
6	Haripur	72.879956	33.850077	Acacia	Maid Zaman	06-vi-2017
7	Haripur	72.880792	33.846955	Grasses	Maid Zaman	06-vi-2017
8	Haripur	72.985807	33.801012	Olive	Maid Zaman	04-vii-2018
9	Haripur	73.124762	33.80939	Pinus	Maid Zaman	04-vii-2018
10	Haripur	73.181394	33.874276	Shrubs	Maid Zaman	05-vii-2017
11	Haripur	73.168568	33.953068	Olive	Maid Zaman	06-vii-2018
12	Haripur	73.136461	33.923888	Pinus	Maid Zaman	20-vii-2018
13	Haripur	72.970579	33.84812	Dung	Maid Zaman	05-ix-2018
14	Haripur	72.960861	33.907047	Wheat	Maid Zaman	05-ix-2018
15	Haripur	72.920586	33.90833	Grasses	Maid Zaman	05-ix-2018
16	Haripur	72.954676	33.928925	Phulahi	Maid Zaman	04-iv-2017
17	Haripur	72.975508	33.953475	Wheat	Maid Zaman	18-iv-2017
18	Haripur	72.929032	33.964939	Grasses	Maid Zaman	29-v-2017
19	Haripur	72.952602	34.082743	Grasses	Maid Zaman	19-vi-2018
20	Haripur	72.912832	34.269509	Hop bush	Maid Zaman	8-viii-2018
21	Haripur	72.959007	34.22306	Dung	Maid Zaman	13-viii-2018
22	Haripur	73.025483	33.94733	Guava	Maid Zaman	10-viii-2018
23	Buner	72.476074	34.189599	Grasses	Maid Zaman	04-v-2016
24	Buner	72.503138	34.190689	Jujube	Maid Zaman	05-v-2016
25	Buner	72.517072	34.22687	Wood	Maid Zaman	30-v-2016
26	Buner	72.603395	34.302386	Maize	Maid Zaman	30-vii-2017

S. no.	District	X	Y	Host food	Collector	Date of collection
27	Buner	72.489975	34.343447	Jujube	Maid Zaman	30-vi-2016
28	Buner	72.571884	34.391567	Maize	Maid Zaman	19-ix-2016
29	Buner	72.630004	34.389174	Jujuba	Maid Zaman	19-ix-2017
30	Buner	72.664832	34.413651	Dung	Maid Zaman	17-vii-2016
31	Buner	72.684593	34.374145	Oranges	Maid Zaman	29-v-2017
32	Buner	72.709915	34.40045	Maize	Maid Zaman	30-v-2016
33	Buner	72.499983	34.447829	Maize	Maid Zaman	24-vii-2016
34	Buner	72.485594	34.487095	Jujube	Maid Zaman	21-vii-2016
35	Buner	72.514634	34.570324	Grasses	Maid Zaman	07-x-2016
36	Buner	72.458983	34.488126	Jujube	Maid Zaman	16-vii-2016
37	Buner	72.364905	34.435525	Eucalyptus	Maid Zaman	19-vii-2017
38	Swabi	72.685544	34.11661	Maize	Maid Zaman	05-v-2018
39	Swabi	72.704853	34.139624	Grasses	Maid Zaman	11-v-2018
40	Swabi	72.560164	34.157049	China berry	Maid Zaman	29-v-2018
41	Swabi	72.581682	34.151207	Oranges	Maid Zaman	17-ix-2017
42	Swabi	72.583135	34.141526	Oranges	Maid Zaman	30-ix-2018
43	Swabi	72.604251	34.01644	Acacia	Maid Zaman	14-viii-2019
44	Swabi	72.554524	34.067817	Wheat	Maid Zaman	16-vi-2018
45	Swabi	72.501019	34.016208	Rose sp.	Maid Zaman	23-vii-2019
46	Swabi	72.408076	34.021332	Maize	Maid Zaman	20-vii-2018
47	Swabi	72.330368	34.00201	Jujube	Maid Zaman	22-vii-2019
48	Swabi	72.32994	34.043377	Paper mulberry	Maid Zaman	17-vi-2018
49	Swabi	72.393493	34.060452	Grasses	Maid Zaman	19-vii-2019
50	Swabi	72.384956	34.104299	Wheat	Maid Zaman	19-vii-2019
51	Swabi	72.346565	34.085261	Dung	Maid Zaman	13-vi-2018
52	Swabi	72.284307	34.126975	Stubbles	Maid Zaman	17-v-2018
53	Swabi	72.352052	34.208843	Wood	Maid Zaman	16-vii-2018
54	Swabi	72.435991	34.172798	White mulberry	Maid Zaman	19-viii-2019

S. no.	District	X	Y	Host food	Collector	Date of collection
55	Swabi	72.388513	34.325003	Wood	Maid Zaman	27-ix-2019
56	Swabi	72.485745	34.089993	Acacia	Maid Zaman	17-x-2019

Table S13 Material examined for the morphometric analysis of *O. horai* from the studied area during, 2016-19.

S. no.	District	X	Y	Host food	Collector	Date of collection
1	Haripur	72.873311	33.79535	Shrubs	Maid Zaman	10-vi-2017
2	Haripur	72.966911	33.88017	Wild pomegranate	Maid Zaman	30-vii-2017

Sequence alignments

O. parvidens:

The reference sequence of *O. longignathus* (NC_034130.1) was aligned with our sequence showing 97% identity. But when top match sequence (MH557840.1) of BLAST retrieved from the NCBI was again aligned with the refseq of *O. longignathus* (NC_034130.1), it resulted in a 96.03% identity match, indicating novel sequence (Figures S1 and S2.

Score	Expect	Identities	Gaps	Strand
1048 bits(567)	0.0	611/633(97%)	0/633(0%)	Plus/Plus

```
Query  3110  CTAAACTTGAGTCTCCAAGACAGAGCATCACCAATCATAGAACAACTAATCTTCTTCCAC  3169
Sbjct  1     ......C.....................................................  60

Query  3170  GACCATGCCCTAATAATCATACTAATAATCATCACCACAGTTATATACACAATAACCAGA  3229
Sbjct  61    .....C.............................T...........T............  120

Query  3230  ATTATTCAAAATAAACAAACCAGCCGATTCATCCTAGAAGGCCAAATAATTGAGACCCTC  3289
Sbjct  121   ..C........C..................................................  180

Query  3290  TGAACCATTGCACCAGCAATCATCCTGGTATTCATTGCAATACCATCCCTCCGATTACTT  3349
Sbjct  181   ..........................................................  240

Query  3350  TACCTAATAGACGAAGTACACAACCCAACCCTAACACTAAAAGCAGTAGGACATCAATGA  3409
Sbjct  241   ..........T.........................................C......  300

Query  3410  TACTGAAGCTACGAATACTCAGACTTTACAAAACTAGAATTCGATTCATACATAACACAA  3469
Sbjct  301   ..........T.............................T..C..............  360

Query  3470  GAACAGCAAGCAAGCACATTTCGGCTCCTAGATACAGACAACCGAATTGTCCTACCAATA  3529
Sbjct  361   .........A..GA.................C.................T.........  420

Query  3530  AACTCACCAACCCGAATAATTGTTACAGCAGCAGATGTACTGCATTCGTGAACAGTACCA  3589
Sbjct  421   ....................................C.......................  480

Query  3590  AGACTAGGAGTAAAAACAGATGCCACCCCAGGACGGTTAAATCAAGTCAGATTCTCAATC  3649
Sbjct  481   ..................C..............AC........................  540

Query  3650  AACCGACCTGGAATTCTATACGGGCAATGCTCAGAAATCTGTGGAGCAAACCACAGATTT  3709
Sbjct  541   ..............C.............................................C  600

Query  3710  ATACCGATTATAATCGAAAGAGTAACCACAAAC  3742
Sbjct  601   ................................  633
```

Figure S1 Alignment of the *O. parvidens* (sbjct) with the NC_034130.1 (Query) (NCBI curated refseq of *O. longignathus*).

Score	Expect	Identities	Gaps	Strand
1190 bits(644)	0.0	702/731(96%)	0/731(0%)	Plus/Plus

```
Query  3059  GCTCCATGAATAAAGTTTTTAACTTTCATTAGAACAAAAATGGCAACATGACTAAACTTG  3118
Sbjct  1     ............................................A.............C..  60

Query  3119  AGTCTCCAAGACAGAGCATCACCAATCATAGAACAACTAATCTTCTTCCACGACCATGCC  3178
Sbjct  61    ....................G.................................C...  120

Query  3179  CTAATAATCATACTAATAATCATCACCACAGTTATATACACAATAACCAGAATTATTCAA  3238
Sbjct  121   ........T.............................................C......  180

Query  3239  AATAAACAAACCAGCCGATTCATCCTAGAAGGCCAAATAATTGAGACCCTCTGAACCATT  3298
Sbjct  181   ...........T...........T.................................C  240

Query  3299  GCACCAGCAATCATCCTGGTATTCATTGCAATACCATCCCTCCGATTACTTTACCTAATA  3358
Sbjct  241   ..G.........................................C.............  300

Query  3359  GACGAAGTACACAACCCAACCCTAACACTAAAAGCAGTAGGACATCAATGATACTGAAGC  3418
Sbjct  301   ............G....G.......................C...............  360

Query  3419  TACGAATACTCAGACTTTACAAAACTAGAATTCGATTCATACATAACACAAGAACAGCAA  3478
Sbjct  361   ..T............................T..C.......................  420

Query  3479  GCAAGCACATTTCGGCTCCTAGATACAGACAACCGAATTGTCCTACCAATAAACTCACCA  3538
Sbjct  421   A..GA......C...........C..................T...........T......  480

Query  3539  ACCCGAATAATTGTTACAGCAGCAGATGTACTGCATTCGTGAACAGTACCAAGACTAGGA  3598
Sbjct  481   .....................................A.....................  540

Query  3599  GTAAAAACAGATGCCACCCCAGGACGGTTAAATCAAGTCAGATTCTCAATCAACCGACCT  3658
Sbjct  541   ...........C.............AC.............................  600

Query  3659  GGAATTCTATACGGGCAATGCTCAGAAATCTGTGGAGCAAACCACAGATTTATACCGATT  3718
Sbjct  601   ...................................................C.........  660

Query  3719  ATAATCGAAAGAGTAACCACAAACAAATTCATTAATTGAATCTCAAAGATAAGAGAATCA  3778
Sbjct  661   ............................................................  720

Query  3779  TCAGATGACTG  3789
Sbjct  721   ...........  731
```

Figure S2. Alignment of the MH557840.1 (sbjct) with the NC_034130.1 (Query) (NCBI curated refseq of *O. longignathus*).

O. assmuthi:

In the absence of refseq for *O. assmuthi*, a refseq (NC_034027.1) of *O. obesus* curated by NCBI was manually retrieved followed by alignment in the online BLAST search with our sequence. The resulting alignment is presented in Figure S3, showing 95.6% identity match to the refseq (NC_034027.1). For further justification, top matches accessions no. KP864045.1 (*O. obesus*); KP864044.1 (*O. obesus*); MN913606.1 (*Odontotermes* sp.); MH557841.1 (*O. obesus*) were aligned with refseq (NC_034027.1) *O. obesus*, which resulted in to 95.16%, 95.48%, 96.77% and 96.07% identity matches, respectively (Figures S4-S7).

Score	Expect	Identities	Gaps	Strand
876 bits(474)	0.0	522/546(96%)	0/546(0%)	Plus/Plus

```
Query  3130  ACAGAGCATCACCAATTATAGAACAACTAATCTTCTTCCACGACCATGCTCTAATAATCA  3189
Sbjct  1     ..............C................................C..........  60

Query  3190  TACTAATAATCATCACCACAGTTATGTATACAATAACCAGAATCATTCAAAATAAACAAA  3249
Sbjct  61    ............................C.............T.................  120

Query  3250  CCAGCCGATTCATCCTAGAGGGCCAAATAATTGAAACCCTCTGAACCATCGCTCCAGCAA  3309
Sbjct  121   ...................A...........C.....................A.......  180

Query  3310  TCATCTTGGTATTCATTGCAATACCATCTCTCCGTCTACTCTACCTAATAGATGAAGTAC  3369
Sbjct  181   ............................C.............T.................  240

Query  3370  ACAACCCAGCACTAACACTAAAAGCAGTAGGACACCAATGATATTGAAGCTATGAATACT  3429
Sbjct  241   ...........T..........G.....G..G...........C.................  300

Query  3430  CAGACTTCACAAAACTAGAATTTGACTCATACATAACGCAAGAACAACAAGCAGACACAT  3489
Sbjct  301   ....................................A.......................  360

Query  3490  TCCGTCTACTAGACACAGACAACCGAATCGTACTACCAATAAACTCACCAACACGAATAA  3549
Sbjct  361   ....C..C.............................................C.......  420

Query  3550  TCGTTACAGCAGCAGACGTACTGCACTCATGAACAGTACCAAGACTAGGAGTGAAAACAG  3609
Sbjct  421   .T.....................A...........C.........................  480

Query  3610  ATGCCACCCCAGGACGACTAAATCAAGTAAGATTCTCAATCAACCGACCTGGAATTCTAT  3669
Sbjct  481   ............................C.......................G...T...  540

Query  3670  ACGGGC  3675
Sbjct  541   ......  546
```

Figure S3. Alignment of the *O. assmuthi* (sbjct) with the NC_034027.1 (Query) (NCBI curated refseq of *O. obesus*).

Score	Expect	Identities	Gaps	Strand
1013 bits(548)	0.0	610/641(95%)	0/641(0%)	Plus/Plus

```
Query  3129  GACAGAGCATCACCAATTATAGAACAACTAATCTTCTTCCACGACCATGCTCTAATAATC  3188
Sbjct  1     ..............C................................C.........  60

Query  3189  ATACTAATAATCATCACCACAGTTATGTATACAATAACCAGAATCATTCAAAATAAACAA  3248
Sbjct  61    ............................C.............T................  120

Query  3249  ACCAGCCGATTCATCCTAGAGGGCCAAATAATTGAAACCCTCTGAACCATCGCTCCAGCA  3308
Sbjct  121   ...................A...........C...........C........A......  180

Query  3309  ATCATCTTGGTATTCATTGCAATACCATCTCTCCGTCTACTCTACCTAATAGATGAAGTA  3368
Sbjct  181   ............................C.............T................  240

Query  3369  CACAACCCAGCACTAACACTAAAAGCAGTAGGACACCAATGATATTGAAGCTATGAATAC  3428
Sbjct  241   ...........T..........G.....G..G........C..C..C............  300

Query  3429  TCAGACTTCACAAAACTAGAATTTGACTCATACATAACGCAAGAACAACAAGCAGACACA  3488
Sbjct  301   ....................................A.....................  360

Query  3489  TTCCGTCTACTAGACACAGACAACCGAATCGTACTACCAATAAACTCACCAACACGAATA  3548
Sbjct  361   .....C..C.............................................C......  420

Query  3549  ATCGTTACAGCAGCAGACGTACTGCACTCATGAACAGTACCAAGACTAGGAGTGAAAACA  3608
Sbjct  421   ..T.....................A........C..C.......................  480

Query  3609  GATGCCACCCCAGGACGACTAAATCAAGTAAGATTCTCAATCAACCGACCTGGAATTCTA  3668
Sbjct  481   ............................C.................C.....G...T..  540

Query  3669  TACGGGCAATGCTCAGAAATCTGTGGAGCAAACCACAGATTCATACCGATTACAATCGAA  3728
Sbjct  541   ................................T............................  600

Query  3729  AGAGTAACCACAAACAAATTCATTAATTGAATCTCAAAGAT  3769
Sbjct  601   ............................C............  641
```

Figure S4. Alignment of the KP864045.1 (*O. obesus*) (sbjct) with the NC_034027.1 (Query) (NCBI curated refseq of *O. obesus*).

Score	Expect	Identities	Gaps	Strand
1024 bits(554)	0.0	612/641(95%)	0/641(0%)	Plus/Plus

```
Query  3129  GACAGAGCATCACCAATTATAGAACAACTAATCTTCTTCCACGACCATGCTCTAATAATC  3188
Sbjct  1     .................C................................C.........  60

Query  3189  ATACTAATAATCATCACCACAGTTATGTATACAATAACCAGAATCATTCAAAATAAACAA  3248
Sbjct  61    ............................C..............T................  120

Query  3249  ACCAGCCGATTCATCCTAGAGGGCCAAATAATTGAAACCCTCTGAACCATCGCTCCAGCA  3308
Sbjct  121   ...................A.......................C........A......  180

Query  3309  ATCATCTTGGTATTCATTGCAATACCATCTCTCCGTCTACTCTACCTAATAGATGAAGTA  3368
Sbjct  181   ............................C..............T................  240

Query  3369  CACAACCCAGCACTAACACTAAAAGCAGTAGGACACCAATGATATTGAAGCTATGAATAC  3428
Sbjct  241   ......................G.....G...........C..C..C............  300

Query  3429  TCAGACTTCACAAAACTAGAATTTGACTCATACATAACGCAAGAACAACAAGCAGACACA  3488
Sbjct  301   ....................................A.....................  360

Query  3489  TTCCGTCTACTAGACACAGACAACCGAATCGTACTACCAATAAACTCACCAACACGAATA  3548
Sbjct  361   .....C..C...........T.............................C......  420

Query  3549  ATCGTTACAGCAGCAGACGTACTGCACTCATGAACAGTACCAAGACTAGGAGTGAAAACA  3608
Sbjct  421   ..T...................A........C..C.....................  480

Query  3609  GATGCCACCCCAGGACGACTAAATCAAGTAAGATTCTCAATCAACCGACCTGGAATTCTA  3668
Sbjct  481   ............................C.................C.....G...T..  540

Query  3669  TACGGGCAATGCTCAGAAATCTGTGGAGCAAACCACAGATTCATACCGATTACAATCGAA  3728
Sbjct  541   ..............................T............................  600

Query  3729  AGAGTAACCACAAACAAATTCATTAATTGAATCTCAAAGAT  3769
Sbjct  601   ............................C............  641
```

Figure S5. Alignment of the KP864044.1 (*O. obesus*) (sbjct) with the NC_034027.1 (Query) (NCBI curated refseq of *O. obesus*).

Score	Expect	Identities	Gaps	Strand
1240 bits(671)	0.0	719/743(97%)	0/743(0%)	Plus/Plus

```
Query  3058  AAGCTCCATGAATAAAGTTTTTAACTTTCATTAGAACCAAAATGACAACATGACTAAACC  3117
Sbjct  1     ............................................................  60

Query  3118  TAAGACTTCAAGACAGAGCATCACCAATTATAGAACAACTAATCTTCTTCCACGACCATG  3177
Sbjct  61    ............................................................  120

Query  3178  CTCTAATAATCATACTAATAATCATCACCACAGTTATGTATACAATAACCAGAATCATTC  3237
Sbjct  121   .C..........................................C.............T....  180

Query  3238  AAAATAAACAAACCAGCCGATTCATCCTAGAGGGCCAAATAATTGAAACCCTCTGAACCA  3297
Sbjct  181   ............................A...............................  240

Query  3298  TCGCTCCAGCAATCATCTTGGTATTCATTGCAATACCATCTCTCCGTCTACTCTACCTAA  3357
Sbjct  241   ....A.....................................C.....C........T....  300

Query  3358  TAGATGAAGTACACAACCCAGCACTAACACTAAAAGCAGTAGGACACCAATGATATTGAA  3417
Sbjct  301   .......G..............T.................G..............C....  360

Query  3418  GCTATGAATACTCAGACTTCACAAAACTAGAATTTGACTCATACATAACGCAAGAACAAC  3477
Sbjct  361   ....................................................A.........  420

Query  3478  AAGCAGACACATTCCGTCTACTAGACACAGACAACCGAATCGTACTACCAATAAACTCAC  3537
Sbjct  421   ................C..C...........T..............................  480

Query  3538  CAACACGAATAATCGTTACAGCAGCAGACGTACTGCACTCATGAACAGTACCAAGACTAG  3597
Sbjct  481   ....C.............................A...........T..............  540

Query  3598  GAGTGAAAACAGATGCCACCCCAGGACGACTAAATCAAGTAAGATTCTCAATCAACCGAC  3657
Sbjct  541   ....................................C.....................  600

Query  3658  CTGGAATTCTATACGGGCAATGCTCAGAAATCTGTGGAGCAAACCACAGATTCATACCGA  3717
Sbjct  601   ....G...T.................................T................  660

Query  3718  TTACAATCGAAAGAGTAACCACAAACAAATTCATTAATTGAATCTCAAAGATAAGAGAAT  3777
Sbjct  661   ..........................................................G.  720

Query  3778  CATCAGATGACTGAAAGCAAGTA  3800
Sbjct  721   ........................  743
```

Figure S6. Alignment of the MN913606.1 (*Odontotermes sp.*) (sbjct) with the NC_034027.1 (Query) (NCBI curated refseq of *O. obesus*).

Score	Expect	Identities	Gaps	Strand
1245 bits(674)	0.0	734/764(96%)	0/764(0%)	Plus/Plus

```
Query  3037  GCAGATAAGTGCGGTGGATTTAAGCTCCATGAATAAAGTTTTTAACTTTCATTAGAACCA  3096
Sbjct  1     ............AT............................................  60

Query  3097  AAATGACAACATGACTAAACCTAAGACTTCAAGACAGAGCATCACCAATTATAGAACAAC  3156
Sbjct  61    ..................................................C.........  120

Query  3157  TAATCTTCTTCCACGACCATGCTCTAATAATCATACTAATAATCATCACCACAGTTATGT  3216
Sbjct  121   ......................C.....................................  180

Query  3217  ATACAATAACCAGAATCATTCAAAATAAACAAACCAGCCGATTCATCCTAGAGGGCCAAA  3276
Sbjct  181   .C..............T........C...........................A.......  240

Query  3277  TAATTGAAACCCTCTGAACCATCGCTCCAGCAATCATCTTGGTATTCATTGCAATACCAT  3336
Sbjct  241   ........................A............C.....................  300

Query  3337  CTCTCCGTCTACTCTACCTAATAGATGAAGTACACAACCCAGCACTAACACTAAAAGCAG  3396
Sbjct  301   .C..............T...................G.......T..........G....  360

Query  3397  TAGGACACCAATGATATTGAAGCTATGAATACTCAGACTTCACAAAACTAGAATTTGACT  3456
Sbjct  361   ................C.........................................  420

Query  3457  CATACATAACGCAAGAACAACAAGCAGACACATTCCGTCTACTAGACACAGACAACCGAA  3516
Sbjct  421   ..........A..........................C..C...................  480

Query  3517  TCGTACTACCAATAAACTCACCAACACGAATAATCGTTACAGCAGCAGACGTACTGCACT  3576
Sbjct  481   ........................C.............................A....  540

Query  3577  CATGAACAGTACCAAGACTAGGAGTGAAAACAGATGCCACCCCAGGACGACTAAATCAAG  3636
Sbjct  541   .......C..........................C..T.................C....  600

Query  3637  TAAGATTCTCAATCAACCGACCTGGAATTCTATACGGGCAATGCTCAGAAATCTGTGGAG  3696
Sbjct  601   .C.......................G........T.....................C....  660

Query  3697  CAAACCACAGATTCATACCGATTACAATCGAAAGAGTAACCACAAACAAATTCATTAATT  3756
Sbjct  661   ....T.....................................................  720

Query  3757  GAATCTCAAAGATAAGAGAATCATCAGATGACTGAAAGCAAGTA  3800
Sbjct  721   ..........................................  764
```

Figure S7 Alignment of the MH557841.1 (*O. obesus*) (sbjct) with the NC_034027.1 (Query) (NCBI curated refseq of *O. obesus*).

O. obesus:

Refseq (NC_034027.1) aligned with our sequence are presented in Figure S8 showed 100% match confirming the morphological identification of the species *O. obesus.*

Score	Expect	Identities	Gaps	Strand
1120 bits(606)	0.0	606/606(100%)	0/606(0%)	Plus/Plus

```
Query  3139  CACCAATTATAGAACAACTAATCTTCTTCCACGACCATGCTCTAATAATCATACTAATAA  3198
Sbjct  1     ............................................................  60

Query  3199  TCATCACCACAGTTATGTATACAATAACCAGAATCATTCAAAATAAACAAACCAGCCGAT  3258
Sbjct  61    ............................................................  120

Query  3259  TCATCCTAGAGGGCCAAATAATTGAAACCCTCTGAACCATCGCTCCAGCAATCATCTTGG  3318
Sbjct  121   ............................................................  180

Query  3319  TATTCATTGCAATACCATCTCTCCGTCTACTCTACCTAATAGATGAAGTACACAACCCAG  3378
Sbjct  181   ............................................................  240

Query  3379  CACTAACACTAAAAGCAGTAGGACACCAATGATATTGAAGCTATGAATACTCAGACTTCA  3438
Sbjct  241   ............................................................  300

Query  3439  CAAAACTAGAATTTGACTCATACATAACGCAAGAACAACAAGCAGACACATTCCGTCTAC  3498
Sbjct  301   ............................................................  360

Query  3499  TAGACACAGACAACCGAATCGTACTACCAATAAACTCACCAACACGAATAATCGTTACAG  3558
Sbjct  361   ............................................................  420

Query  3559  CAGCAGACGTACTGCACTCATGAACAGTACCAAGACTAGGAGTGAAAACAGATGCCACCC  3618
Sbjct  421   ............................................................  480

Query  3619  CAGGACGACTAAATCAAGTAAGATTCTCAATCAACCGACCTGGAATTCTATACGGGCAAT  3678
Sbjct  481   ............................................................  540

Query  3679  GCTCAGAAATCTGTGGAGCAAACCACAGATTCATACCGATTACAATCGAAAGAGTAACCA  3738
Sbjct  541   ............................................................  600

Query  3739  CAAACA  3744
Sbjct  601   ......  606
```

Figure S8. Alignment of the *O. obesus* (sbjct) with the NC_034027.1 (Query) (NCBI curated refseq of *O. obesus*).

O. horai

To check the novelty of current sequence and validity of the matched taxon and in the absence of refseq for *O. horai*, a refseq (NC_034027.1) of *O. obesus* curated by NCBI was manually retrieved followed by alignment in the online BLAST search with our sequence. The resulting alignment is presented in Figure S9, showing 98.22% identity match to refseq (NC_034027.1), implying that our sequences are not homologues to *O. obesus*.

Score	Expect	Identities	Gaps	Strand
881 bits(477)	0.0	496/505(98%)	2/505(0%)	Plus/Plus

```
Query  3156  CTAATCTTCTTCCACGACCATGCTCTAATAATCATACTAATAATCATCACCACAGTTATG  3215
Sbjct  3     ................G.........................................  62

Query  3216  TATACAATAACCAGAATCATTCAAAATAAACAAACCAGCCGATTCATCCTAGAGGGCCAA  3275
Sbjct  63    ............................-............................  121

Query  3276  ATAATTGAAACCCTCTGAACCATCGCTCCAGCAATCATCTTGGTATTCATTGCAATACCA  3335
Sbjct  122   ...G.........................................-..........  180

Query  3336  TCTCTCCGTCTACTCTACCTAATAGATGAAGTACACAACCCAGCACTAACACTAAAAGCA  3395
Sbjct  181   ............................................................  240

Query  3396  GTAGGACACCAATGATATTGAAGCTATGAATACTCAGACTTCACAAAACTAGAATTTGAC  3455
Sbjct  241   ...C.............................C......................  300

Query  3456  TCATACATAACGCAAGAACAACAAGCAGACACATTCCGTCTACTAGACACAGACAACCGA  3515
Sbjct  301   .............................................A..............  360

Query  3516  ATCGTACTACCAATAAACTCACCAACACGAATAATCGTTACAGCAGCAGACGTACTGCAC  3575
Sbjct  361   .........................................G..................  420

Query  3576  TCATGAACAGTACCAAGACTAGGAGTGAAAACAGATGCCACCCCAGGACGACTAAATCAA  3635
Sbjct  421   ................G...........................................  480

Query  3636  GTAAGATTCTCAATCAACCGACCTG  3660
Sbjct  481   .........................  505
```

Figure S9. Alignment of the *O. horai* (sbjct) with the NC_034027.1 (Query) (NCBI curated refseq of *O. obesus*).