

Appendix 1. Data matrix of 76 character states of morphology of *Launaea* species.

Criteria	Species									
	<i>L. nudicaulis</i>	<i>L. intybacea</i>	<i>L. massauensis</i>	<i>L. capitata</i>	<i>L. angustifolia</i> subsp. <i>angustifolia</i>	<i>L. angustifolia</i> subsp. <i>arabica</i>	<i>L. fragilis</i> subsp. <i>fragilis</i>	<i>L. fragilis</i> subsp. <i>tenuiloba</i>	<i>L. mucronata</i>	<i>L. cassintiana</i>
1	1	1	1	1	1	1	2	2	2	2
2	2	2	2	2	2	2	2	2	2	2
3	2	2	2	1	2	2	2	2	2	2
4	3	4	4	1	4	4	4	2	2	4
5	3	3	3	1	2	2	4	4	4	4
6	1	2	2	2	1	2	1	1	1	1
7	1	1	2	1	2	2	1	2	1	2
8	2	1	1	2	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1	4	1
10	1	1	1	1	1	1	1	1	1	1
11	1	5	1	3	1	1	3	3	3	3
12	3	2	2	2	4	4	4	4	4	4
13	1	2	1	1	1	1	2	2	1	1
14	1	1	2	2	1	1	3	3	1	1
15	1	3	1	1	3	3	3	3	3	3
16	2	2	3	2	2	2	2	2	3	3
17	1	1	1	1	1	1	2	1	2	2
18	2	1	2	2	1	1	3	3	4	4
19	1	1	1	2	1	1	1	1	1	1
20	2	2	1	2	2	2	2	2	2	2
21	3	2	3	2	4	4	4	4	4	4
22	1	1	3	3	4	4	4	4	2	2
23	1	3	3	4	2	2	2	2	2	2
24	1	1	1	2	1	1	1	1	1	1
25	2	1	1	3	3	3	3	3	2	2
26	2	1	1	3	3	3	3	3	3	3
27	2	1	1	1	3	3	3	3	3	3
28	3	2	2	1	4	4	3	3	3	3
29	3	3	3	2	3	2	3	3	2	1
30	1	1	1	1	2	2	1	1	1	1
31	1	1	1	1	2	2	2	2	1	1
32	1	1	2	2	2	2	2	2	1	1
33	1	1	1	2	1	2	1	1	1	1
34	1	1	1	1	1	1	1	1	1	1
35	1	1	1	1	1	1	1	1	1	1
36	3	1	1	1	1	1	1	1	1	1
37	1	1	1	1	1	1	1	1	1	1
38	1	1	1	3	1	1	2	2	1	1
39	2	1	1	2	3	3	3	3	2	2

Appendix 1 Cont.

Criteria	Species									
	<i>L. nudicaulis</i>	<i>L. intybacea</i>	<i>L. massauensis</i>	<i>L. capitata</i>	<i>L. angustifolia</i> subsp. <i>angustifolia</i>	<i>L. angustifolia</i> subsp. <i>arabica</i>	<i>L. fragilis</i> subsp. <i>fragilis</i>	<i>L. fragilis</i> subsp. <i>tenuiloba</i>	<i>L. mucronata</i>	<i>L. cassianiana</i>
40	1	1	1	1	1	1	1	1	1	1
41	2	2	2	2	1	1	1	1	1	1
42	2	2	2	2	2	2	2	2	2	2
43	2	2	2	1	4	4	3	3	2	2
44	3	3	3	4	5	5	5	5	5	5
45	4	1	1	1	4	4	3	3	3	3
46	1	1	1	1	4	4	3	3	3	3
47	2	1	1	1	2	2	1	1	1	1
48	3	1	1	1	2	2	3	3	2	2
49	2	1	1	1	2	2	3	3	2	2
50	2	2	2	1	1	1	1	1	1	1
51	2	2	2	2	2	2	2	2	2	2
52	1	1	1	3	1	2	2	1	1	1
53	2	2	1	1	3	2	3	3	3	4
54	1	1	1	3	2	2	2	2	2	2
55	2	2	2	2	1	1	1	1	1	2
56	4	4	4	1	3	3	2	2	3	3
57	2	2	2	3	2	2	1	1	1	3
58	1	2	2	2	1	2	1	1	1	1
59	1	2	2	2	1	1	2	2	2	1
60	1	2	2	1	1	1	1	1	1	1
61	1	1	1	1	2	2	2	2	2	2
62	1	1	1	1	1	1	1	1	2	2
63	2	2	2	2	1	1	3	3	3	3
64	3	3	3	1	3	3	3	3	2	2
65	1	1	1	2	1	2	1	1	2	1
66	2	1	1	2	2	2	2	2	2	2
67	2	2	1	2	3	3	1	2	3	3
68	1	1	1	1	2	2	1	1	1	1
69	1	1	1	1	1	1	2	2	2	2
70	2	2	2	1	3	3	2	2	2	2
71	3	2	1	1	2	1	3	1	2	2
72	1	1	1	2	1	1	1	1	1	2
73	2	2	2	1	2	1	2	2	2	1
74	1	1	1	1	2	2	2	2	2	2
75	2	2	2	3	2	1	2	2	2	2
76	2	2	2	1	2	2	2	2	2	1

Appendix 2. FTIR criteria of *Launaea* species.

	<i>L. nudicaulis</i>	<i>L. intybacea</i>	<i>L. massauensis</i>	<i>L. capitata</i>	<i>L. angustifolia</i> subsp. <i>angustifolia</i>	<i>L. angustifolia</i> subsp. <i>arabica</i>	<i>L. fragilis</i> subsp. <i>fragilis</i>	<i>L. fragilis</i> subsp. <i>tenuitoba</i>	<i>L. mucronata</i>	<i>L. cassiniana</i>
O-H stretching vibrations of hydroxyl groups	1	1	1	1	1	1	1	1	1	1
H-bonded alcohols, phenols	1	1	1	1	1	1	1	1	1	1
N-H stretching of 1° and 2° amines and amides	1	1	1	1	1	1	1	1	1	1
C-H stretching of CH ₂	1	1	1	1	1	1	1	1	1	1
(NH)C=O stretching	1	1	0	1	0	0	0	0	0	0
NO ₂	1	1	1	1	0	0	0	0	0	0
C-N stretching of aliphatic amines or to alcohols or phenols	1	1	1	1	0	0	0	0	0	0
O-Si-O stretching	1	1	1	1	0	0	0	1	0	0
C-H stretching of aldehyde	1	0	0	0	0	0	0	0	0	0
C-N stretching of primary and secondary amines	0	0	1	1	0	0	0	0	1	1
NH ₂ Wagging of amino	0	0	1	0	1	1	0	1	1	1
Lead	0	0	1	1	0	0	0	0	0	0
N-H stretching of aliphatic and aromatic amines	0	0	1	1	0	0	0	1	0	0
C=C or C-N stretching of aromatic amines	0	0	0	0	1	1	1	0	0	0
C-O vibration	0	0	0	0	1	1	0	1	0	0
C-Cl bending	0	0	0	0	1	0	0	0	0	0
-C-O-C	0	0	0	0	1	1	1	1	0	0
C=C stretching of alkene	0	0	0	0	0	1	0	0	0	0
C-N stretching of aromatic and aliphatic amines	0	0	0	0	0	0	1	0	0	0
C-C-N asymmetric stretching vibration	0	0	0	0	0	0	1	0	0	0
C-N,C=N stretching	0	0	0	0	0	0	1	0	0	0
C-Cl stretching	0	0	0	0	0	0	0	0	1	1
C-N stretching of amino	0	0	0	0	0	0	0	0	1	1
C-H stretching of alkane	0	0	0	0	0	0	0	0	1	0