The codes of morphological characters for the standard MP analysis and 3TA.

The character states are: (0)—assumed as a plesiomorphic charater state, (1)—assumed as apomorphic character state, (2)—indicates an alternative apomorphic character state.

Life-history

1. Life history: (0) dwarf robust shrub; (1) dwarf caespitose undershrub; (2) tall undershrub with stout shoots; (3) robust shrub.
2. Annual shoots, diameter: (0) 1.5–3.0 mm; (1) 1.0–1.5 mm.
3. Annual shoots: (0) elongated; (1) elongated and constricted.
4. Annual shoot: (0) lignified, not spiny; (1) herbaceous, died off to the base, (2) lignified, spiny.
5. Position of thyrses: (0) terminal; (1) terminal and lateral, (2) lateral constricted.
6. Surface of annual shoot: (0) velutinous-puberulent, (1) papillose, (2) glabrous.

Leaf blade

7. Shape of leaf blade (length/width ratio): (0) L/W> 4, (1) 2< L/W< 4, (2) 1< L/W< 2.
8. Petiole length: (0) 1–2 mm, (1) less than 1 mm, (2) more than 2 mm.
9. Leaf blade margin: (0) revolute, (1) undulate, crenulate, (2) smooth and flat.
10. Leaf blades in thyrses: (0) developed, (1) reduced, (2) absent.

Ocrea

11. Ocrea length: (0) 2–4 mm, (1) 5–8 mm, (2) 9–12 mm.
12. Ocrea shape: (0) lanceolate-bilacerate (1) truncate-tubular, later 2–4-lacerate, (2) biaristate, with two subulate lacinulas connected by inciso-serrate middle part.

Perianth

13. Outer/inner segments ratio length: (0) 1, (1) 2/3–1/2, (2) ½–1/4.
14. Filiform part of perianth tube: (0) <0.3 mm, (1) 0.3–1.0 mm, (2) > 1 mm.
15. Perianth partition: (0) 9/10–4/5, (1) 2/3–3/4, (2) 2/3–1/2.
16. Perianth consistence: (0) petaloid, not accressent, (1) leafy (2) petaloid, accressent.
17. Shape of perianth segments: (0) broadly elliptical, (1) lanceolate, (2) oblong-elliptical (3) broadly ovate, rotundate, cordate, or reniform.
18. Perianth surface: (0) glabrous with papillate margin, (1) totally papillate, (2) papillae at tube, (3) glabrous.
19. Papillae at tube: (0) absent, (1) linear, (2) conical.
20. Filaments: (0) adnate to the base of perianth receptacle, (1) adnate to the middle part of receptacle, (2) inserted in the top of receptacle.
21. Location of nectar-secreating zone: (0) receptacle, (1) receptacle and the bases of filaments, (2) receptacle and the bases of filaments adaxially.
22. Sporoderm ornamentation: (0) foveolate to foveolate-perforate, (1) microreticulate-foveolate to microreticulate-perforate, (2) foveolate-perforate to perforate, (3) reticulate-perforate to striate-perforate, (4) striate-perforate.

Achene

23. Achene / perianth length: (0) >1 (exserted achene), (1) <1 (hidden achene).
24. Achene surface: (0) smooth or smooth-pitted, (1) minutely tuberculate.
25. Styles: (0) free from base, (1) connate at base.
26. Stigmas: (0) mini-capitate, (1) linear, (2) capitate (3) fimbriate-capitate.
27. Merosity: (0) trigonous, (1) lenticular.

Matrix of 27 morphological characters scored for 22 species of *Bactria Polygonum* subsection *Spinescentia*, and *Atraphaxis* s.s.

Taxa	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**
Bactria lazkovii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?	0
B. ovczinnikovii	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0
P. salicornioides	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**2**	**1**	**1**	**1**	**1**	**2**	**0**	**1**	**1**	**1**	**0**
P. spinosum	**1**	**1**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**2**	**1**	**1**	**1**	**1**	**2**	**0**	**1**	**1**	**1**	**0**
P. aridum	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**0**	**1**	**1**	**2**	**1**	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**0**
P. dumosum	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**1**	**2**	**1**	**1**	**1**	**1**	**4**	**0**	**1**	**1**	**1**	**0**
P. khajeh-jamalii	**1**	**1**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**1**	**0**	**1**	**0**	**0**	**1**	**1**	**2**	**1**	**1**	**1**	**?**	**?**	**0**	**?**	**1**	**?**	**0**
A. toktogulica	2	0	0	1	0	1	1	0	1	2	2	2	0	1	1	0	2	2	2	1	1	3	1	1	1	2	0
A. atraphaxiformis	0	0	0	0	0	1	2	0	1	2	0	2	0	1	1	0	2	2	2	1	1	4	1	1	1	2	0
A. tortuosa	0	0	0	0	0	1	2	0	1	2	0	2	0	1	1	0	2	2	2	1	1	4	1	1	1	2	0
A. ariana	2	0	0	1	0	1	0	2	1	2	2	2	0	1	1	0	3	2	2	1	1	4	1	0	1	2	0
A. badghysi	2	0	0	0	0	1	0	2	0	0	0	2	0	2	2	2	3	2	2	2	2	4	1	0	0	?	0
A. angustifolia	2	0	0	0	0	1	0	1	0	1	0	2	1	1	1	2	3	3	0	2	2	4	1	0	0	?	0
A. spinosa	3	0	1	2	1	2	2	0	0	2	0	2	2	2	1	2	3	3	0	2	2	4	1	0	0	3	1
A. fischeri	3	0	1	0	1	2	2	0	1	2	0	2	2	2	1	2	3	3	0	2	2	4	1	0	0	3	1
A. teretifolia	0	0	1	0	2	1	0	1	0	0	0	0	2	1	0	2	3	3	0	2	2	4	1	0	0	3	0
A. frutescens	2	0	0	1	0	1	0	0	0	2	1	2	2	2	2	2	3	3	0	2	2	4	1	0	0	3	0
A. virgata	3	0	0	0	0	2	1	0	1	2	1	2	2	2	2	2	3	3	0	2	2	4	1	0	0	3	0
A. seravschanica	3	0	0	0	1	2	2	0	2	2	0	2	2	2	2	2	3	3	0	2	2	4	1	0	0	3	0
A. pungens	3	0	1	2	2	2	1	2	2	2	1	2	2	2	1	2	3	3	0	2	2	4	1	0	0	3	0
A. pyrifolia	3	0	1	2	2	2	2	2	2	2	1	2	2	2	2	2	3	3	0	2	2	4	1	0	0	3	0
A. laetevirens	3	0	0	0	1	2	2	0	2	2	0	2	2	2	2	2	3	3	0	2	2	4	1	0	0	3	0