Data Article

Dataset of pollen morphological traits of 56 dominant species among desert vegetation in the eastern arid central Asia

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Abstract
The data presented in this article are related to the research article entitled "Pollen spectrum, a cornerstone for tracing the evolution of the eastern central Asian desert" (JQSR 5260) (Lu et al., 2018) [1]. In this paper, we supply a dataset, which provides a descriptive and general summary of pollen characteristic of desert dominant species in the eastern arid central Asia (ACA). The other important component is the illustration on pollen grains traits under light microscopy (LM) and scanning electron microscopy (SEM). Pollen grains of 56 species are extracted from voucher specimens from the PE herbarium at the Institute of Botany. It is worth noting that these species own special distribution patterns in China. The distribution maps are plotted using the Google Maps and the species distribution data at the county level supplied by the Chinese Virtual Herbarium (http://www.cvh.ac.cn/).

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**Specifications Table**

| Subject area         | Botany |
|----------------------|--------|
| More specific sub-   | Palynology and morphology of desert dominant plant species. |
| area                  |        |
| Type of data         | Tables of the voucher specimen list and pollen morphological characters Illustrations of microscope images for pollen grains Distribution maps for these species |
| How data was acquired| Field investigations and collections |
| Data format          | Tables in MS Word format *.doc Illustrations of microscope images in 32-bit RGB JPG (300dpi) Distribution maps in 32-bit RGB JPG (300dpi) |
| Experimental factors | Pollen grains are acetolyzed by the standard method and fixed in glycerin jelly. |
| Experimental features| Standard procedures are followed for light microscopy and scanning electron microscopy. |
| Data source location | China |
| Data accessibility   | The data are available with this article |
| Related research article | K.Q. Lu, G. Xie, M. Li, J.F. Li, A. Trivedi, D. K. Ferguson, Y.F. Yao, Y.F. Wang. Pollen spectrum, a cornerstone for tracing the evolution of the eastern central Asian desert, Quat. Sci. Rev. 186, 2018, 111-122. |

**Value of the Data**

- The dataset includes pollen morphological characteristics and distribution patterns of 56 dominant species among the desert vegetation in eastern ACA.
- The pollen descriptions with related illustrations could be used to identify pollen grains at the generic or species level.
- The distribution maps could be used to interpret distribution patterns of 56 dominant species among the desert vegetation in eastern ACA.

1. **Data**

The dataset of this article provides information on the diversity of pollen features of the dominant species in the eastern ACA desert and the distribution patterns of these species in China. Plates 1–11 and Table 1 show the diversity of pollen morphology. Figs. 1–7 present the distribution patterns of the 56 species in China. The pollen descriptions are provided in Appendix A.

1.1. **Pollen images of the 56 dominant species in the eastern arid Central Asia desert**

See plates Plates 1–11.
Plate 1. a-c. Peganum harmala; d-f. Nitraria roborowskii; g-i. Nitraria sphaerocarpa; j-l. Tetraena mongolica; m-o. Zygophyllum xanthoxylon. Bar in LM and SEM overview 10 µm, in SEM close-up 1 µm.
Plate 2. a-c. Calligonum roborowskii; d-f. Calligonum mongolicum; g-i. Calligonum leucocladum; j-l. Calligonum rubicundum; m-o. Potaninia mongolica. Bar in LM and SEM overview 10 μm, in SEM close-up 1 μm.
Plate 3. a-c. Ammopiptanthus mongolicus; d-f. Ammodendron bifolium; g-i. Caragana korshinskii; j-l. Alhagi sparsifolia; m-o. Helianthemum songaricum. Bar in LM and SEM overview 10 μm, in SEM close-up 1 μm.
Plate 4. a-c. Seriphidium santolinum; d-f. Seriphidium borotalense; g-i. Seriphidium rhodanthum; j-l. Seriphidium kaschgaricum; m-o. Seriphidium terrae-albae. Bar in LM and SEM overview 10 μm, in SEM close-up 1 μm.
Plate 5. a-c. Artemisia ordosica; d-f. Artemisia sphaerocephala; g-i. Artemisia nanschanica; j-l. Artemisia desertorum; m-o. Kar-elinia caspia. Bar in LM and SEM overview 10 \( \mu \)m, in SEM close-up 1 \( \mu \)m.
Plate 6. a-c. *Ajania fruticulosa*; d-f. *Ajania fastigiata*; g-i. *Ajania tibetica*; j-l. *Asterothamnus centrali-asiaticus*; m-o. *Cistanche deserticola*. Bar in LM and SEM overview 10 μm, in SEM close-up 1 μm.
Plate 7. a-c. Anabasis aphylla; d-f. Anabasis salsa; g-i. Anabasis brevifolia; j-l. Atriplex cana; m-o. Halostachys caspica. Bar in LM and SEM overview 10 μm, in SEM close-up 1 μm.
Plate 8. a-c. Halocnemum strobilaceum; d-f. Haloxylon ammodendron; g-i. Haloxylon persicum; j-l. Iljinia regelii; m-o. Sympegma regelii. Bar in LM and SEM overview 10 μm, in SEM close-up 1 μm.
Plate 9. a-c. Kalidium schrenkianum; d-f. Kalidium cuspidatum; g-i. Krascheninnikovia compacta; j-l. Krascheninnikovia ceratoïdes; m-o. Nanophyton erinaceum. Bar in LM and SEM overview 10 μm, in SEM close-up 1 μm.
Plate 10. a-c. Salsola passerina; d-f. Salsola abrotanoides; g-i. Suaeda physophora; j-l. Suaeda microphylla; m-o. Gymnocarpos przewalskii. Bar in LM and SEM overview 10 μm, in SEM close-up 1 μm.
Plate 11. a-c. Reaumuria soongarica; d-f. Tamarix chinensis; g-i. Psammochloa villosa; j-l. Populus euphratica; m-o. Convolvulus tragacanthoides; p-r. Ephedra przewalskii. Bar in LM and SEM overview 10 μm, in SEM close-up 1 μm.
### 1.2. Data of pollen morphological characteristics

See Table 1.

#### Table 1

Pollen morphological characters of 56 dominant and indicative species in NW China, eastern ACA.

| Species                  | Polar axis \(\mu m\) | Equatorial axis \(\mu m\) | P/E (mean) | Shape | Aperture   | Exine ornamentation | Exine thickness \(\mu m\) | Plates |
|--------------------------|----------------------|---------------------------|------------|-------|------------|--------------------|--------------------------|--------|
| *Peganum harmala*        | (21.5-)23.5 (-25.1)  | (19.0-)21.5 (-23.3)       | 1.09       | spheroidal | tricolporate | reticulate         | 1.7                      | a-c    |
| *Nitraria roborowskii*   | (31.4-)34.5 (-36.8)  | (19.6-)22.0 (-24.2)       | 1.57       | prolate   | tricolporate | striate            | 2.7                      | d-f    |
| *Nitraria sphaerocarpa*  | (28.8-)33.9 (-38.5)  | (21.8-)23.8 (-26.7)       | 1.42       | prolate   | tricolporate | striate            | 2.5                      | g-i    |
| *Tetraena mongolica*     | (13.1-)15.0 (-16.3)  | (11.5-)12.6 (-13.7)       | 1.19       | subprolate | tricolporate | reticulate         | 1.1                      | j-l    |
| *Zygothylum xanthoxylon* | (16.3-)19.0 (-23.2)  | (13.8-)16.5 (-20.0)       | 1.16       | subprolate | tricolporate | reticulate         | 1.6                      | m-o    |
| *Calligonum roborowskii* | (30.1-)32.3 (-37.8)  | (25.5-)28.3 (-32.8)       | 1.05       | spheroidal | tricolporate | foveolate          | 2.3                      | 2a-c   |
| *Calligonum mongolicum*  | (34.5-)35.9 (-38.6)  | (32.4-)34.1 (-35.4)       | 1.09       | spheroidal | tricolporate | foveolate          | 2.6                      | 2d-f   |
| *Calligonum leucocladum* | (26.7-)30.4 (-32.1)  | (22.8-)27.4 (-30.5)       | 1.11       | spheroidal | tricolporate | foveolate          | 2.4                      | 2g-i   |
| *Peganum mongolica*      | (28.8-)33.9 (-40.2)  | (23.9-)29.7 (-35.9)       | 1.13       | spheroidal | tricolporate | foveolate          | 2.3                      | 2j-l   |
| *Ammoniopiptanthus*      | (16.3-)20.3 (-25.4)  | (13.3-)17.9 (-20.8)       | 1.14       | subprolate | tricolporate | striate            | 1.7                      | 2m-o   |
| *Ammoniopiptanthus*      | (15.3-)21.1 (-23.3)  | (13.3-)16.9 (-18.4)       | 1.25       | subprolate | tricolporate | microreticulate    | 1.3                      | 3a-c   |
| *Ammoniopiptanthus*      | (15.9-)17.9 (-20.4)  | (14.9-)17.1 (-18.9)       | 1.05       | spheroidal | tricolporate | microreticulate    | 1.4                      | 3d-f   |
| *Caragana korshinskii*   | (17.8-)21.3 (-25.5)  | (13.3-)17.4 (-21.9)       | 1.24       | subprolate | tricolporate | foveolate          | 1.6                      | 3g-i   |
| *Alhagi sparsifolia*     | (13.1-)13.7 (-17.1)  | (11.9-)13.7 (-15.3)       | 1.08       | spheroidal | tricolporate | microreticulate    | 1.2                      | 3j-l   |
| *Helianthemum songaricum*| (37.8-) 39.6 (-40.4) | (33.7-)37.6 (-39.8)       | 1.05       | spheroidal | tricolporate | reticulate         | 3.9                      | 3m-o   |
| *Seriphidium santolinum* | (20.5-)22.7 (-25.1)  | (20.9-)23.1 (-26.1)       | 0.98       | spheroidal | tricolporate | microechinate      | 3.0                      | 4a-c   |
| *Seriphidium borotalense*| (17.4-)19.6 (-22.7)  | (14.6-)19.4 (-21.2)       | 1.02       | spheroidal | tricolporate | microechinate      | 2.8                      | 4d-f   |
| *Seriphidium rhodanthum* | (19.6-)22.5 (-29.5)  | (20.4-)22 (-24.2)         | 1.02       | spheroidal | tricolporate | microechinate      | 2.6                      | 4g-i   |
| *Seriphidium kaschgaricum*| (20.4-)21.9 (-24.5)  | (19.5-)21.3 (-22.6)       | 1.03       | spheroidal | tricolporate | microechinate      | 2.8                      | 4j-l   |
| *Seriphidium terraecolae*| (18.0-)21.4 (-26.1)  | (17.7-)21.1 (-27.0)       | 1.01       | spheroidal | tricolporate | microechinate      | 2.8                      | 4m-o   |
| *Artemisia ordosica*     | (17.6-)20.5 (-23.5)  | (17.0-)18.3 (-21.3)       | 1.12       | spheroidal | tricolporate | microechinate      | 2.4                      | 5a-c   |
| *Artemisia sphaerocephala*| (17.6-)23.2 (-25.3)  | (16.0-) 21 (-23.9)        | 1.11       | spheroidal | tricolporate | microechinate      | 3.0                      | 5d-f   |
| *Artemisia nanschanica*  | (17.5-)20.2 (-24.4)  | (15.3-)18.1 (-20.1)       | 1.12       | spheroidal | tricolporate | microechinate      | 2.5                      | 5g-i   |
| *Artemisia desertorum*   | (16.7-)20.9 (-24.7)  | (14.6-)19.0 (-21.0)       | 1.10       | spheroidal | tricolporate | microechinate      | 2.7                      | 5j-l   |
| *Karelinia caspia*       | (18.7-)25.0 (-29.6)  | (19.8-)23.7 (-26.7)       | 1.07       | spheroidal | tricolporate | echinate-perforate | 3.3                      | 5m-o   |
| *Ajania fruticulosa*     | (22.7-)24.4 (-26.4)  | (21.2-)23.3 (-26.2)       | 1.05       | spheroidal | tricolporate | echinate-perforate | 3.6                      | 6a-c   |
| *Ajania fastigiata*      | (22.2-)27.0 (-31.9)  | (18.6-)25.3 (-31.9)       | 1.07       | spheroidal | tricolporate | echinate-perforate | 3.8                      | 6d-f   |
| Species                        | Polar axis /μm | Equatorial axis /μm | P/E (mean) | Shape                  | Aperture         | Exine ornament | Exine thickness /μm | Plates |
|-------------------------------|----------------|---------------------|------------|------------------------|------------------|----------------|---------------------|--------|
| Ajania tibetica               | (21.0-)23.2   | (20.3-)22.2         | 1.05       | spheroidal              | tricolporate echinate | 3.3             | 6g-i                |        |
| A. centralis                  | (25.5-)28.2   | (24.0-)26.9         | 1.05       | spheroidal              | tricolporate echinate-perforate | 2.6             | 6j-l                |        |
| Cistanche deserticola         | (14.9-17.7    | (14.6-)16.9         | 1.21       | subprolate              | tricolpate       | 1.8             | 6m-o                |        |
| Anabasis aphylla              | (13.8-)18.4   | (13.3-)17.9         | 1.05       | spheroidal              | pantoporate      | 2.0             | 7a-c                |        |
| A. salsa                      | (16.2-)19.2   | (14.9-)18.3         | 1.05       | spheroidal              | pantoporate      | 2.0             | 7g-i                |        |
| A. brevifolia                 | (16.3-)19.2   | (14.8-)18.6         | 1.04       | spheroidal              | pantoporate      | 2.1             | 7j-l                |        |
| Halostachys caspica           | (14.7-)18     | (14.5-)16.9         | 1.06       | spheroidal              | pantoporate      | 1.8             | 7m-o                |        |
| Halocnemum strobilaceum       | (14.8-)17.3   | (13.5-)16.5         | 1.05       | spheroidal              | pantoporate      | 1.9             | 8a-c                |        |
| Haloxylon ammodendron         | (15.9-)19.2   | (15.3-)18.8         | 1.02       | spheroidal              | pantoporate      | 1.4             | 8d-f                |        |
| Haloxylon persicum            | (11.3-)11.6   | (10.7-)12.1         | 1.03       | spheroidal              | pantoporate      | 1.6             | 8g-i                |        |
| I. regelii                    | (15.7-)18.5   | (15.1-)17.6         | 1.05       | spheroidal              | pantoporate      | 1.4             | 8j-l                |        |
| K. schrenkianum               | (16.7-)19     | (15.8-)18.2         | 1.05       | spheroidal              | pantoporate      | 2.0             | 9a-c                |        |
| K. cuspidatum                 | (14.1-)17.4   | (12.6-)16.5         | 1.05       | spheroidal              | pantoporate      | 1.8             | 9d-f                |        |
| Krascheninnikovia compacta    | (20.3-)23.8   | (20.4-)22.6         | 1.05       | spheroidal              | pantoporate      | 2.3             | 9g-i                |        |
| K. ceratoides                 | (19.2-)24.6   | (18.6-)23.4         | 1.05       | spheroidal              | pantoporate      | 2.2             | 9j-l                |        |
| Nanophyton erinaceum          | (18.4-)16.8   | (16.0-)18.0         | 1.03       | spheroidal              | pantoporate      | 1.8             | 9m-o                |        |
| Salsola passerina             | (21.0-)24.9   | (20.7-)24.2         | 1.03       | spheroidal              | pantoporate      | 2.3             | 10a-c               |        |
| Salsola abrotanoides          | (17.2-)19.0   | (16.9-)18.3         | 1.04       | spheroidal              | pantoporate      | 1.9             | 10d-f               |        |
| Sueda physophora              | (17.3-)18.8   | (14.8-)17.5         | 1.07       | spheroidal              | pantoporate      | 1.9             | 10g-i               |        |
| Sueda microphylla             | (20.0-)23.3   | (17.7-)22.4         | 1.04       | spheroidal              | pantoporate      | 2.2             | 10j-l               |        |
| Gymnocarpus przewalskii       | (18.4-)23.6   | (17.1-)22.7         | 1.04       | spheroidal              | pantoporate      | 2.2             | 10m-o               |        |
| Reaumuria soongarica          | (11.5-)13.1   | (9.0-)10.4          | 1.27       | subprolate              | tricolpate       | 1.2             | 11a-c               |        |
| Tamari chinesis               | (13.2-)16.3   | (14.0-)15.5         | 1.14       | spheroidal              | tricolpate       | 1.7             | 11d-f               |        |
| Psammochloa villosa           | (40.9-)43.1   | (31.3-)35.2         | 1.23       | subprolate              | monoporate       | 2.3             | 11g-i               |        |
| Populus euphratica            | (19.3-)26.8   | (19.1-)25.0         | 1.07       | spheroidal              | inaperturate     | 1.6             | 11j-l               |        |
| Convolvulus tragacanthoides   | (51.7-)61.9   | (34.5-)47.5         | 1.32       | subprolate              | tricolpate       | 5.5             | 11m-o               |        |
| Ephedra przewalskii           | (24.5-)29.9   | (14.8-)16.3         | 1.84       | prolate                 | inaperturate     | 2.0             | 11p-r               |        |
1.3. Distribution maps of the 56 dominant species in China

See Figs 1–7.

**Fig. 1.** a. Peganum harmala; b. Nitraria roborowskii; c. Nitraria sphaerocarpa; d. Tetraena mongolica; e. Zygophyllum xanthoxylon; f. Calligonum roborowskii; g. Calligonum mongolicum; h. Calligonum leucocladum. The colour of the bars from red to white representing the probability of the species occurrence decreasing.
Fig. 2. a. Calligonum rubicundum; b. Potaninia mongolica. c. Ammopiptanthus mongolicus; d. Ammodendron bifolium; e. Caragana korshinskii; f. Alhagi sparsifolia; g. Helianthemum songaricum; h. Seriphidium santolinum. The colour of the bars from red to white representing the probability of the species occurrence decreasing.
Fig. 3. a. Seriphidium borotalense; b. Seriphidium rhodanthum; c. Seriphidium kaschgaricum; d. Seriphidium terrae-albae; e. Artemisia ordosica; f. Artemisia sphaerocephala; g. Artemisia nanschanica; h. Artemisia desertorum. The colour of the bars from red to white representing the probability of the species occurrence decreasing.
Fig. 4. a. Karelinia caspia; b. Ajania fruticulosa; c. Ajania fastigiata; d. Ajania tibetica; e. Asterothamnus centrali-asiaticus; f. Cistanche deserticola; g. Anabasis aphylla; h. Anabasis salsa. The colour of the bars from red to white representing the probability of the species occurrence decreasing.
Fig. 5. a. Anabasis brevifolia; b. Atriplex cana; c. Halostachys caspica; d. Halocnemum strobilaceum; e. Haloxylon ammodendron; f. Haloxylon persicum; g. Iljinia regelii; h. Sympegma regelii. The colour of the bars from red to white representing the probability of the species occurrence decreasing.
Fig. 6. a. Kalidium schrenkianum; b. Kalidium cuspidatum; c. Krascheninnikovia compacta; d. Krascheninnikovia ceratoïdes; e. Nanophyton erinaceum; f. Salsola passerina; g. Salsola abrotanoides; h. Suaeda physophora. The colour of the bars from red to white representing the probability of the species occurrence decreasing.
Fig. 7. a. Suaeda microphylla; b. Gymnocarpos przewalskii; c. Reaumuria soongarica; d. Tamarix chinensis; e. Psammochloa villosa; f. Populus euphratica; g. Convolulus tragacanthoides; h. Ephedra przewalskii. The colour of the bars from red to white representing the probability of the species occurrence decreasing.
2. Experimental design, materials, and methods

2.1. Experimental design

Here, we attempt to 1) depict a pollen spectrum of the dominant species in desert vegetation to improve the resolution and accuracy of pollen identification in the eastern ACA, and 2) plot distribution maps of each dominant species for a better understanding of the distribution patterns of these desert plants [1].

2.2. Materials

Pollen grains of 56 species were extracted from voucher specimens (Table 2) from the PE herbarium at the Institute of Botany (herbarium code: PE). The distribution maps are plotted using the

| No. | Family       | Genus       | Species            | Coll. No. | Specimen No. | Distribution |
|-----|--------------|-------------|--------------------|-----------|--------------|--------------|
| 1   | Asteraceae   | Ajania      | A. fruticulosa     | 7859      | 00386862     | Fig. 4b      |
| 2   |              | A. fastigiata | 522              |           | 00386826     | Fig. 4c      |
| 3   |              | A. tibetica  | 12808             |           | 00420246     | Fig. 4d      |
| 4   | Artemisia    | A. ordosica  | H.3194            | 00445889  | Fig. 3e      |
| 5   |              | A. sphaerocephala | 44    |           | 01894259     | Fig. 3f      |
| 6   |              | A. nanschanica | W.5650   | 00445844  | Fig. 3g      |
| 7   |              | A. desertorum | 6339      |           | 00421401     | Fig. 3h      |
| 8   | Asterothamnus | A. centrali-asiaticus | L.2318 | 00301799 | Fig. 4a      |
| 9   | Karelinia    | K. caspia   | 3696              |           | 01577791     | Fig. 2a      |
| 10  | Seriphidium  | S. santolinux | 3797        | 00457656  | Fig. 2h      |
| 11  |              | S. borotalese | 5141           |           | 00457452     | Fig. 2a      |
| 12  |              | S. rhodanthum | 116      |           | 00457852     | Fig. 2b      |
| 13  |              | S. kaschgaricum | 74-1434     | 00457555  | Fig. 2c      |
| 14  |              | S. terra-albae | 2977         | 00457814  | Fig. 2d      |
| 15  | Caryophyllaceae | Gymnocarpos   | G. przewalskii  | Tazhong0010 | 00583459 | Fig. 2e      |
| 16  |               | Anabasis     | A. aphylla       | h29       | 00120575     | Fig. 2f      |
| 17  |               |              | A. brevifolia    | 80-459    | 00120685     | Fig. 2g      |
| 18  |               |              | A. salsa        | 1-363     | 00147264     | Fig. 2h      |
| 19  | Atriplex     | A. cana     | 6978             | 00120126  | Fig. 2i      |
| 20  | Halocnemum   | H. strobilaceum | 15       | 00540950  | Fig. 2j      |
| 21  | Halostachys  | H. caspica  | 253              | 00416286  | Fig. 2k      |
| 22  | Haloxylon    | H. ammodendron | 148       | 00541353  | Fig. 2l      |
| 23  |              | H. persicum  | s.n.             | 00542109  | Fig. 2m      |
| 24  | Iljinia      | I. regelli  | 502              | 001196845 | Fig. 2n      |
| 25  | Kalidium     | K. cuspidatum | 8743         | 00541652  | Fig. 2o      |
| 26  |               | K. schrenkianum | 9778        | 00509851  | Fig. 2p      |
| 27  | Krischeninnikiovia | K. compacta | 609              | 00540518  | Fig. 2q      |
| 28  |              | K. latens   | 13666            | 00147145  | Fig. 2r      |
| 29  | Nanophyton   | N. erinaceum | 6673           | 00526712  | Fig. 2s      |
| 30  | Sabola       | S. abrotanoides | 11593     | 00145945  | Fig. 2t      |
| 31  |              | S. passerina | 200           | 00528119  | Fig. 2u      |
| 32  | Suueda       | S. microphylla | 3408       | 00527362  | Fig. 2v      |
| 33  |              | S. physophora | 4534         | 00527387  | Fig. 2w      |
| 34  | Sympegma     | S. regelli  | 305              | 00527736  | Fig. 2x      |
| 35  | Cistaceae    | Helianthemum | H. songaricum   | 151       | 001176401    | Fig. 2y      |
| 36  | Convolvulaceae | Convolvulus | C. tragoanthoides | 2689   | 00112946    | Fig. 2z      |
| 37  | Ephedraceae  | Ephedra     | E. przewalskii  | 11605    | 01606079     | Fig. 3a      |
| 38  | Fabaceae     | Alhagi      | A. sparsifolia   | 11613    | 01468293     | Fig. 3b      |
| 39  | Ammodendron  | A. bifolium | SW7400216       | 00099928  | Fig. 3c      |
| 40  | Ammopiptanthus | A. mongolicus | 1537        | 00099950  | Fig. 3d      |
| 41  | Caragana     | C. korshinskii | 10029       | 00180727  | Fig. 3e      |
| 42  | Nitriaceae   | Nitraria    | N. roborowskii  | 123       | 00965946     | Fig. 3f      |
Google Maps and the species distribution data at the county level supplied by the Chinese Virtual Herbarium (http://www.cvh.ac.cn/).

2.3. Methods and terminology

Pollen grains were acetolized by the standard method [2] and fixed in glycerin jelly. Standard procedures were followed for light microscopy (LM) and scanning electron microscopy (SEM). All pollen grains were observed and photographed at a magnification of ×400 or 1000 under a Leica 4000 instrument. At least 20 pollen grains were measured for each species. The average values and the variation ranges were used to describe the pollen morphological characters. The fine characteristics of exine ornamentation were observed under SEM.

The pollen morphological terminology follows the overview of Hesse et al. [3] and Punt et al. [4]. For instance, Punt et al. [4] divided the pollen shapes into prolate (1.33–2.00), subprolate (1.14–1.33), spheroidal (0.88–1.14), and suboblate (0.75–0.88) based on their P/E ratio values. The P/E ratio of each pollen grain was calculated using the polar axis diameter (P) and equatorial diameter (E). Hesse et al. [3] defined pollen size as very small (<10 μm), small (10–25 μm), medium (26–50 μm), large (51–100 μm), and very large (>100 μm) based on the pollen diameters.

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Table 2 (continued)

| No. | Family            | Genus     | Species          | Coll. No. | Specimen No. | Distribution |
|-----|-------------------|-----------|------------------|-----------|--------------|-------------|
| 43  | N. sphaerocarpa   | Peganum  | N. sphaerocarpa  | 101       | 00973240     | Fig. 1c      |
| 44  | P. harmala        | Cistanche | P. harmala      | 86013     | 00972516     | Fig. 1a      |
| 45  | C. deserticola    | Psammochloia | C. deserticola | 6499     | 01542440     | Fig. 4f      |
| 46  | P. villosa        | Calligonum | P. villosa      | 89        | 00614742     | Fig. 7e      |
| 47  | C. leucocladum    | C. mongolicum | C. leucocladum | F208     | 01050284     | Fig. 1h      |
| 48  | C. robustus       | C. deserticola | C. robustus     | 1005     | 00041439     | Fig. 1g      |
| 49  | C. leucocladum    | C. deserticola | C. leucocladum | F208     | 01050284     | Fig. 1h      |
| 50  | C. rubicundum     | C. deserticola | C. rubicundum   | 74-1092   | 00041901     | Fig. 2a      |
| 51  | P. mongonica      | Potaninia | P. mongonica    | 10271     | 06064890     | Fig. 2b      |
| 52  | P. euphratica     | Populus   | P. euphratica    | 64-001    | 00562476     | Fig. 7f      |
| 53  | R. soongarica     | Tamarix   | R. soongarica    | 133       | 01177164     | Fig. 7c      |
| 54  | T. chinensis      | Tetraena  | T. chinensis     | s.n.      | 01177582     | Fig. 7d      |
| 55  | T. mongolica      | Zygophyllum | T. mongolica    | s.n.      | 09072777     | Fig. 1d      |
| 56  | Z. xanthoxyylon   | Zygophyllum | Z. xanthoxylon  | 2108     | 00973420     | Fig. 1e      |
Author contributions

The authors declare no conflicts of interest.

Transparency document. Supporting information

Supplementary data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.dib.2018.03.122.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.dib.2018.03.122.

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