

Table S1. A brief detail of the documented woody tree species.

| Tree Species | AC | CU | LN | Family | TT | LF | LS | CH |
|--------------------------------|---------------------------|------|-----------|---------------|---------|----|----|--------------|
| <i>Acacia modesta</i> | (Linn.) Wall. | Acmo | Palosa | Mimosaceae | BLD, AD | MP | L | SU,SS, IT |
| <i>Acacia nilotica</i> | (Linn.) Delile | Acni | Kikar | Mimosaceae | BLD, AD | MP | L | IT, SU, SS |
| <i>Ailanthus altissima</i> | (Mill). Swingle | Aial | Baykanrra | Simaroubaceae | BLD, AD | MP | Mi | Circ, EA |
| <i>Albezzia lebeck</i> | (L.) Benth. | Alle | Srris | Mimosaceae | BLE, AD | MP | L | ES, Trop, IT |
| <i>Broussonetia papyrifera</i> | L. Hertit. Ex vent. | Brpa | Gul Toot | Moraceae | BLD, AD | MP | Me | EA, ITL, GR |
| <i>Capparis decidua</i> | Linn. | Cade | Kirra | Capparidaceae | BLD, AD | NP | Ap | SA, SU |
| <i>Celtis australis</i> | Decne. | Ceeu | Taghage | Ulmaceae | BLD, AD | MP | Me | PLU |
| <i>Dalbergia sissoo</i> | DC. Roxb. | Dasi | Shisham | Papilionaceae | BLE, AD | MP | Mi | IGB |
| <i>Eucalyptus globulus</i> | Labill. | Eugl | Lache | Myrtaceae | BLE, AD | MP | Mi | PLU |
| <i>Ficus palmata</i> | Forssk. | Fipa | Enzar | Moraceae | BLD, AD | MP | Me | IT, M, ES |
| <i>Grewia optiva</i> | J. R. Drumm.ex Burret. | Grop | Pastawane | Tiliaceae | BLD, AD | MP | Mi | Trop |
| <i>Juglans Regia</i> | Linn. | Jure | Ghwaz | Juglandaceae | BLD, AD | MP | Me | IT, ES |
| <i>Mellia azedarach</i> | Linn. | Meaz | Shanday | Meliaceae | BLD, AD | MP | Mi | M |
| <i>Monothea buxifolia</i> | (Falc.) | Mobu | Gurguri | Sapotaceae | BLE, AD | MP | Mi | Trop |
| <i>Morus alba</i> | Linn. | Moal | Toor Toot | Moraceae | BLD, AD | MP | Me | IT, Cos |
| <i>Olea ferruginea</i> | Royle ex Aitch. | Olfe | Khuna | Oleacea | BLE, AD | MP | Mi | IT, M |
| <i>Phoenix dactylifera</i> | Linn. | Phda | Kajoorra | Arecaceae | BLE, AM | MP | Me | SA, IT |
| <i>Pinus gerardiana</i> | Wall. Ex Lamb | Pige | Chalghoza | Pinaceae | CE, GM | MP | L | ES |
| <i>Pinus roxburghii</i> | Sargent | Piro | Nakhtar | Pinaceae | CE, GM | MP | L | ES |
| <i>Populus nigra</i> | Linn. | Poni | Sperdat | Salicaceae | BLD, AD | MP | Me | IT, ES |
| <i>Prunus armeniaca</i> | Linn. | Prar | Khobanay | Rosaceae | BLD, AD | MP | Na | IT, ES |
| <i>Punica granatum</i> | Linn. | Pugr | Anngorre | Lythraceae | BLD, AD | MP | Na | SU, EA |
| <i>Quercus baloot</i> | Griffith. | Quba | Serray | Fagaceae | BLE, AD | MP | Mi | ES, Trop |
| <i>Salvadora oleoides</i> | Dene. | Saol | Paloo | Salvadoraceae | BLD, AD | NP | Na | CA,IT |
| <i>Tamarax aphylla</i> | (L.) H Karst. | Taap | Ghaz | Tamaricaceae | CE, AD | MP | L | SU, IT, CA |
| <i>Zanthoxylum armatum</i> | DC. | Zaar | Dambara | Rutaceae | BLD, AD | NP | Mi | M, PLU |
| <i>Ziziphus mauritiana</i> | Lam. | Zima | Bera | Rhamnaceae | BLE, AD | MP | Na | SA, SU, SS |

AC = Authority citation, CU = Code used, LN = Local name, TT = Tree type, LF = Life form, LS = Leaf spectra, CH = Chorotypes, BLD = Broad leaved deciduous, BLE = Broad leaved evergreen, AD = Angiospermic dicot, AM = Angiospermic monocot, CE = Conifer evergreen, GM = Gymnosperm, MP = Megaphanerophyte, NP = Nanophanerophyte, L = Leptophyllous, Mi = Microphyllous, Me = Mesophyllous, Ap = Apophyllous, Na = Nanophyllous, SU = Sudno Zambezian, SS = Saharo Sindian, IT = Irano Turanian, CA Central Asian, EA = East Asian , ITL = Italian, SA = Saharo Arabian, PLU = Pluriregional , IGB = indo Gangetic Basin, ES = Euro siberian, M = Medeterranean, Trop = Tropical, Cos = Cosmopoliton.

Table S2. Summary of families, tree type, life form, leaf spectra and chorologies of the documented tree species.

| Families | Ge | Spp | CCS (%) | Families | Ge | Spp | CCS (%) |
|---|----------------|-------------------|----------------|---------------------|----------------|-------------------|----------------|
| Arecaceae | 217 | 2500 | 3.70 | Pinaceae | 11 | 220 | 7.41 |
| Capparidaceae | 33 | 70 | 3.70 | Rhamnaceae | 55 | 950 | 3.70 |
| Fagaceae | 8 | 927 | 3.70 | Rosaceae | 91 | 4824 | 3.70 |
| Juglandaceae | 6 | 60 | 3.70 | Rutaceae | 16 | 2070 | 3.70 |
| Lythraceae | 32 | 620 | 3.70 | Salicaceae | 55 | 1000 | 3.70 |
| Meliaceae | 51 | 575 | 3.70 | Sapotaceae | 65 | 800 | 3.70 |
| Mimosaceae | 56 | 2800 | 11.11 | Salvadoraceae | 3 | 113.70 | 3.70 |
| Moraceae | 38 | 1100 | 11.11 | Simaroubaceae | 32 | 170 | 3.70 |
| Myrtaceae | 132 | 5950 | 3.70 | Tamaricaceae | 4 | 78 | 3.70 |
| Oleaceae | 26 | 615 | 3.70 | Tiliaceae | 50 | 450 | 3.70 |
| Papilionaceae | 400 | 9000 | 3.70 | Ulmaceae | 7 | 45 | 3.70 |
| Chorologies | | | | | | | |
| Chorotypes | CCS (%) | Chorotypes | CCS (%) | Chorotypes | CCS (%) | Chorotypes | CCS (%) |
| SU | 11.54 | EA | 5.77 | GR | 1.92 | M | 5.77 |
| SS | 5.77 | ES | 15.38 | SA | 5.77 | Cos | 1.92 |
| IT | 23.08 | Trop | 7.69 | PLU | 5.77 | CA | 3.85 |
| Cir | 1.92 | ITL | 1.92 | IGB | 1.92 | | |
| Tree Types, Life form and Leaf spectra | | | | | | | |
| Tree type | CCS (%) | Life form | CCS (%) | Leaf Spectra | CCS (%) | | |
| BLD | 59.26 | MP | 88.89 | L | 22.22 | | |
| BLE | 29.63 | NP | 11.11 | Mi | 33.33 | | |
| CE | 11.11 | --- | --- | Me | 25.93 | | |
| AD | 88.89 | --- | --- | AP | 3.70 | | |
| AM | 3.70 | --- | --- | Na | 14.81 | | |
| GM | 7.41 | --- | --- | --- | --- | | |

Ge = Genera, Spp = Species number, CCS = Contribution in current study.

Table S3. Correlation and biplot scores of CCA and RDA showing the result of sites-environment of 44 *Monothea* vegetation sites.

| Variables | Correlations* | | | BIPLOT SCORES | | |
|---------------------------------|---------------|--------|--------|---------------|--------|--------|
| | Axis 1 | Axis 2 | Axis 3 | Axis 1 | Axis 2 | Axis 3 |
| Latitude | -0.36 | -0.247 | -0.218 | -0.78 | -0.40 | -0.33 |
| Longitude | -0.269 | -0.09 | -0.265 | -0.58 | -0.14 | -0.40 |
| Elevation | 0.481 | -0.297 | 0.368 | 0.087 | -0.48 | 0.567 |
| Slope | 0.301 | -0.336 | -0.004 | 0.66 | -0.55 | -0.01 |
| Aspect° | 0.203 | -0.175 | 0.06 | 0.444 | -0.28 | 0.092 |
| Clay | 0.076 | -0.527 | 0.086 | 0.166 | -0.86 | 0.132 |
| Silt | -0.246 | -0.241 | -0.206 | -0.53 | -0.39 | -0.31 |
| Sand | 0.227 | 0.393 | 0.183 | 0.496 | 0.648 | 0.281 |
| Texture | 0.342 | 0.447 | -0.134 | 0.749 | 0.736 | -0.20 |
| PH | 0.183 | 0.131 | -0.249 | 0.4 | 0.215 | -0.384 |
| Organic matter (%) | 0.116 | -0.132 | 0.41 | 0.254 | -0.21 | 0.632 |
| Lime (%) | -0.139 | -0.081 | 0.621 | -0.30 | -0.133 | 0.957 |
| Nitrogen (%) | 0.092 | -0.136 | 0.432 | 0.2 | -0.224 | 0.666 |
| Phosphorus (mg/kg) | 0.395 | -0.063 | -0.157 | 0.865 | -0.104 | -0.241 |
| Potassium (mg/kg) | 0.085 | 0.355 | 0.124 | 0.185 | 0.585 | 0.191 |
| Field capacity | -0.127 | -0.125 | -0.105 | -0.27 | -0.205 | -0.161 |
| Bulk density (g/cm) | 0.142 | -0.015 | 0.025 | 0.31 | -0.025 | 0.039 |
| Available water (%) | -0.175 | -0.253 | -0.22 | -0.38 | -0.416 | -0.338 |
| Electrical conductivity (µs/cm) | 0.198 | -0.341 | 0.136 | 0.433 | -0.562 | 0.21 |
| Total dissolve solutes | 0.198 | -0.341 | 0.136 | 0.434 | -0.562 | 0.21 |

, OM= Organic matter, N= Nitrogen, P = Phosphorous, K = Pottasium, FC= Field capacity, BD = Bulk density, AW = Available water, Ec = Electrical conductivity, TDS = Total dissolve solutes.

Note: * Correlations are "intra-set correlations" of ter Braak (1986)

Table S4. Structural attributes of 27 tree species distributed in four communities. Means values were computed following Analysis of Variance for comparison.

| | Mono-Acacia | | Mono-Olea | | Mono-Eugl | | Mono | | P | |
|-------------|------------------|----------------------|----------------------|----------------------|------------------|-----------------------|------------------------|-----------------------|------|-------|
| | D/h | BA/h | D/h | BA/h | D/h | BA/h | D/h | BA/h | D/h | BA/h |
| Mobu | 258.89±10 | 45.87±5 ^a | 259.26±10 | 32.98±5 ^b | 241.97±26 | 62.3±8.2 ^c | 257.15±13 | 35.7±4.7 ^b | 0.88 | 0.01 |
| Eugl | 8.15±4 | 5.1±3 | 0±0 | 0±0 | 0.14±0.1 | 0.14±0.1 | 0.63±0.6 | 0.08±0.08 | 0.07 | 0.16 |
| Quba | 10±5.3 | 2.1±1.1 | 0±0 | 0±0 | 0.294±0.3 | 0.29±0.3 | 0±0 | 0±0 | 0.03 | 0.05 |
| Ceeu | 2.22±1.6 | 0.3±0.21 | 6.67±5.1 | 0.62±0.5 | 0.20±0.2 | 0.2±0.2 | 2.86±2.3 | 0.2±0.2 | 0.35 | 0.74 |
| Aial | 5.93±4.5 | 0.35±1 ^a | 0±0 | 0±0 ^a | 5.35±2.3 | 1.8±1.8 ^a | 2.54±1.9 | 0.2±0.2 ^b | 0.59 | 0.018 |
| Moal | 1.11±0.79 | 0.79±0.6 | 0±0 | 0±0 | 0.65±0.4 | 0.35±0.35 | 0.95±0.9 | 0.6±0.6 | 0.84 | 0.81 |
| Fipa | 1.48±0.63 | 0.63±0.4 | 1.48±1.48 | 0.2±0.2 | 0±0 | 0±0 | 3.49±2 | 0.19±0.12 | 0.29 | 0.24 |
| Olfe | 5.55±2.9 | 1.64±0.8 | 8.89±6.6 | 1.14±0.9 | 8.35±4.6 | 11.9±10.5 | 20.6±11 | 2.7±1.3 | 0.48 | 0.51 |
| Meaz | 0.37±0.37 | 0.08±0.1 | 1.48±1.48 | 0.32±0.3 | 1.29±0.8 | 0.58±0.3 | 0±0 | 0±0 | 0.29 | 0.14 |
| Brpa | 0.37±0.37 | 0.03±0.1 | 0±0 | 0±0 | 0.14±0.14 | 0.14±0.14 | 0±0 | 0±0 | 0.57 | 0.52 |
| Piro | 1.85±1.85 | 0.64±0.6 | 0±0 | 0±0 | 1.1±0.75 | 1.1±0.75 | 4.8±5 | 0.5±0.5 | 0.76 | 0.74 |
| Dasi | 0±0 | 0±0 | 7.4±5.2 | 2.5±1.6 | 0.53±0.53 | 0.53±0.53 | 0.32±0.3 | 0.02±0.02 | 0.01 | 0.09 |
| Zaar | 0±0 | 0±0 | 0±0 | 0±0 | 0.07±0.07 | 0.07±0.07 | 0.6±0.6 | 0.04±0.04 | 0.59 | 0.67 |
| Pige | 0±0 | 0±0 | 0±0 | 0±0 | 0.4±0.4 | 0.4±0.4 | 0±0 | 0±0 | 0.45 | 0.45 |
| Acmo | 11.11±6.12 | 3.6±1.97 | 5.9±4.3 | 2.2±1.5 | 30.92±15 | 12.88±6.1 | 17.78±7 | 3.1±1.3 | 0.44 | 0.143 |
| Pugr | 6.67±6.67 | 0.69±0.7 | 8.89±8.89 | 0.2±0.2 | 0±0 | 0±0 | 0±0 | 0±0 | 0.41 | 0.49 |
| Prar | 0.74±0.74 | 0.39±0.4 | 0±0 | 0±0 | 0±0 | 0±0 | 1.27±1.3 | 0.05±0.05 | 0.70 | 0.51 |
| Acni | 1.11±1.11 | 0.13±0.2 | 0±0 | 0±0 | 1.85±1.3 | 0.2±0.12 | 0±0 | 0±0 | 0.42 | 0.48 |
| Grop | 0±0 | 0±0 | 3.7±3.7 | 0.41±0.4 | 0±0 | 0±0 | 2.54±2. | 0.33±0.33 | 0.49 | 0.53 |
| Poni | 0±0 | 0±0 | 0±0 | 0±0 | 1.1±1.1 | 0.08±0.08 | 0±0 | 0±0 | 0.44 | 0.45 |
| Zimo | 4.81±3.01 | 3.2±3.2 | 0±0 | 0±0 | 1.85±1.8 | 0.39±0.39 | 1.3±1 | 0.26±0.2 | 0.44 | 0.19 |
| Saol | 2.2±2.2 | 0.96±0.9 | 0±0 | 0±0 | 0±0 | 0±0 | 0±0 | 0±0 | 0.45 | 0.45 |
| Alle | 0±0 ^a | 0±0 ^a | 2.2±1.5 ^b | 0.69±1 ^b | 0±0 ^a | 0±0 ^a | 0.32±0.32 ^b | 0.1±0.1 ^a | 0.02 | 0.020 |
| Cade | 0±0 | 0±0 | 0±0 | 0±0 | 0±0 | 0±0 | 3.17±1.9 | 0.19±0.12 | 0.15 | 0.184 |
| Taap | 0±0 | 0±0 | 0±0 | 0±0 | 0±0 | 0±0 | 2.8±2.06 | 0.6±0.4 | 0.27 | 0.23 |
| Phda | 0±0 | 0±0 | 0±0 | 0±0 | 0±0 | 0±0 | 0.32±0.32 | 0.01±0.01 | 0.55 | 0.558 |
| Jure | 1.11±1.11 | 0.13±0.1 | 0±0 | 0±0 | 0±0 | 0±0 | 1.26±0.98 | 0.1±0.1 | 0.70 | 0.71 |

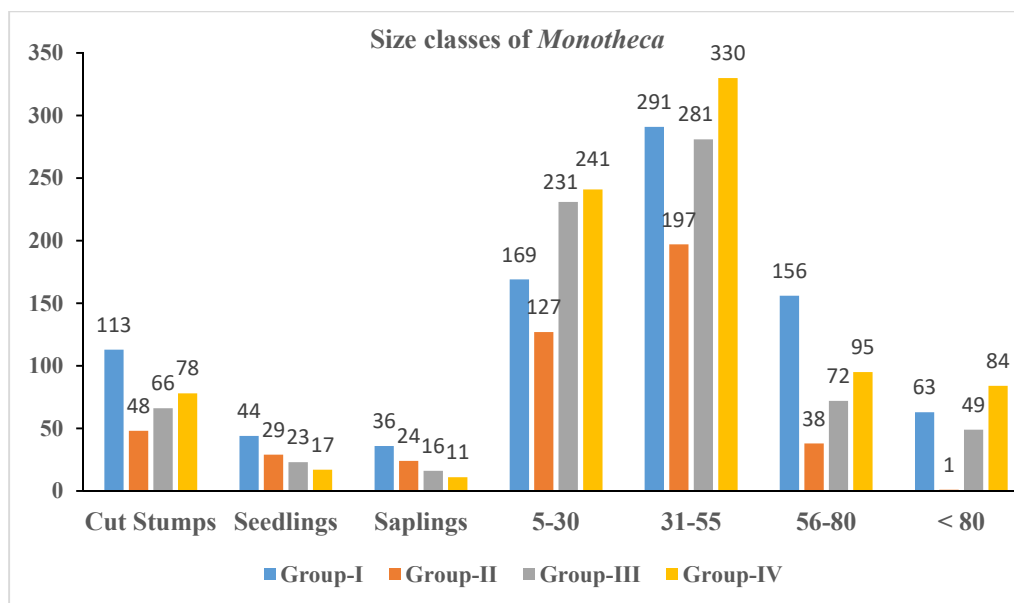


Figure S1. Diameter class distribution of seedling (> 3cm), sapling (3-5 cm), small trees (5-30), medium trees (30-55 cm), large trees (55- 80 cm) and mature trees (> 80 cm) of *Monothea* in Pakistan.

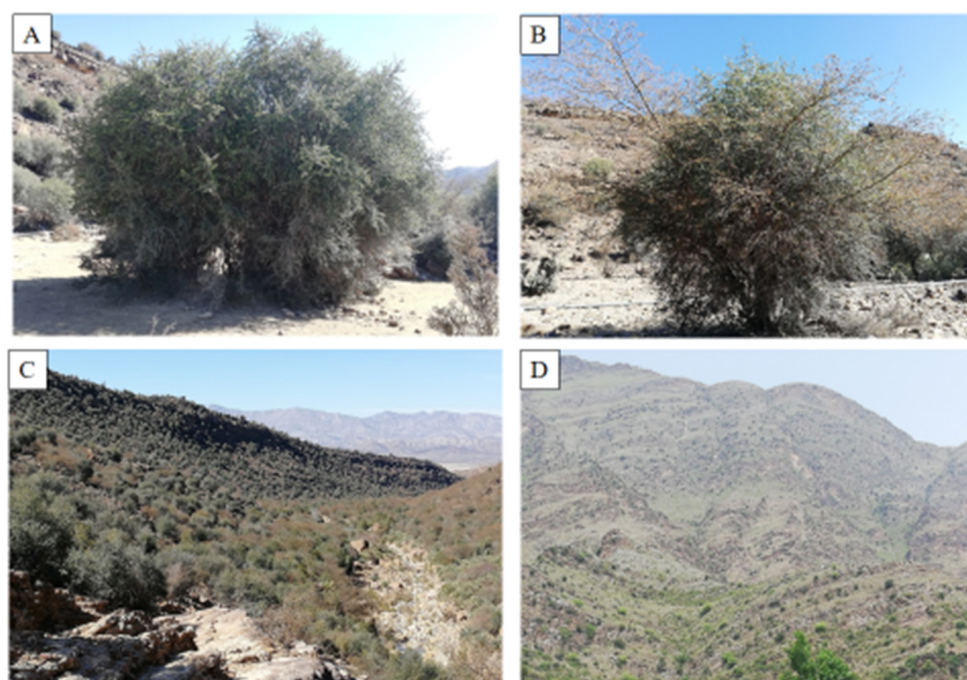


Figure S2. Representatives from (A) *Mono-Olea*, (B) *Mono-Acacia*, (C) *Mono-Olea-Acacia* mixed forest, and (D) scars vegetation of *Monothea*.