BOTANY 300S

Systematic Botany

NOMENCLATURAL PROBLEM SETS

In each of the problem sets, you are presented with a series of original names (basionyms) and their types, followed by some previously proposed combinations based upon them. In the problems that follow each set of names, a taxonomist (who, for purposes of authorship, is considered to be you) makes a series of decisions concerning the disposition of the cited types. For each problem, you must choose the correct name(s), with author citations, or make new combinations or propose new names (indicated by 'your-choice' in the answers) as necessary (in which case you would use your own name in place of 'Student' in the answers). All taxa are considered distinct until appropriate taxonomic decisions are made as stated and conditions cited in earlier questions generally hold until they are explicitly changed.

SET 1. *POPULUS* L. The "Willow of Babylon" mentioned in Old Testament accounts was probably a species of poplar, *Populus euphratica* Oliv., that spans the Old World Tethyan arid zone from Spain and Morocco all the way to China. It, and its closest relatives are such unusual species that they have sometimes been placed in a genus distinct from the cottonwoods, aspens, and other poplars with which we are more familiar. The varied taxonomic treatments that have been applied to these strange trees result in a varied nomenclature.

The following taxa have been described and associated with the corresponding types:

Populus L., 1753
(type: *P. alba* L.)
Balsamiflua Griff., 1848
(type: *B. deltoides* Griff.)
Populus L. sect. *Turanga* Bunge, 1851
(type: *P. euphratica* Oliv.)
Turanga Kimura, 1938
(type: *P. euphratica* Oliv.)
Tsavo Jarmol., 1949
(type: *Celtis ilicifolia* Engler)

Populus alba L., 1753
(type: specimen '**A**')
Populus deltoides Marsh., 1785
(type: specimen '**B**')
Populus euphratica Oliv., 1807
(type: specimen '**C**')
Balsamiflua deltoides Griff., 1854
(type: specimen '**D**')
Celtis ilicifolia Engler, 1895
(type: specimen '**E**')
Populus euphratica Oliv. subsp. *denhardtiorum* Engler, 1898
(type: specimen '**F**')

In addition, the following relevant combinations have been published:

Populus denhardtiorum (Engler) Dode, 1909
Turanga euphratica (Oliv.) Kimura, 1938

Turanga ilicifolia (Engler) Kimura, 1938
Balsamiflua euphratica (Oliv.) Kimura, 1939
Balsamiflua denhardtiorum (Engler) Kimura, 1940
Populus ilicifolia (Engler) Rouleau, 1945
Tsavo ilicifolia (Engler) Jarmol., 1949

Solve the following problems:

1) '**A**' and '**B**' represent distinct species of typical poplars, while '**C**' to '**F** belong to the Willow of Babylon group. If these two groups represent different sections of the same genus, what are the correct sectional names?

2) If '**D**' represents a distinct species of the same genus as '**A**' and '**B**', what is its correct name?

3) If '**D**' belongs to the same species as '**C**', and '**E**' and '**F**' represent another species, what are the correct names of these two species?

4) If '**E**' and '**F**' represent a species of a genus different from that of all other specimens (but not *Celtis*, which was simply a mistaken identification), what is the correct name of the species?

5) If '**C**' and '**D**' also belong to the same genus as '**E**' and '**F**', which is different from the genus of '**A**', and if each pair of specimens represents a subspecies of a single species, what are the correct subspecies names?

6) If we return to the idea that '**D**' represents a distinct species, but decide that it belongs in a genus together with '**B**' that is distinct from the genus of all the other specimens, what are the correct names of the two species containing '**B**' and '**D**'?

ANSWERS FOR SET 1. *POPULUS* L.

1) Populus L. sect. Populus
   Populus L. sect. Turanga Bunge

2) Populus '*your-choice*' 'Student'

3) Populus euphratica Oliv.
   P. ilicifolia (Engler) Rouleau

4) Tsavo ilicifolia (Engler) Jarmol.

5) Balsamiflua euphratica (Oliv.) Kimura subsp. euphratica
   B. euphratica (Oliv.) Kimura subsp. denhardtiorum (Engler) 'Student'

6) Balsamiflua '*your-choice*' 'Student'
   B. deltoides Griff.

SET 2. *OPERCULINA* MANSO. The pop-top morning glories are a small group of about a dozen species with an unusual operculate partial capsule dehiscence that gave their genus its name. Many of them also have winged stems, a feature that has resulted in extensive homonymy. On top of that, most species were originally described in the unrelated genera *Convolvulus* and *Ipomoea* and there has been considerable confusion with the closely related genus *Merremia*.

The following taxa have been described and associated with the corresponding types:

Convolvulus L., 1753
(type: *C. arvensis* L.)
Ipomoea L., 1753
(type: *I. pes-tigridis* L.)
Merremia Dennst., 1818
(type: *M. convolvulacea* Dennst.)
Operculina Manso, 1836

(type: *Convolvulus turpethum* L.)

Convolvulus arvensis L., 1753
(type: specimen '**A**')
Ipomoea pes-tigridis L., 1753
(type: specimen '**B**')
Convolvulus turpethum L., 1753
(type: specimen '**C**')
Ipomoea alata R. Brown, 1810
(type: specimen '**D**')
Merremia convolvulacea Dennst., 1818
(type: specimen '**E**')
Convolvulus alatus Ham., 1824
(type: specimen '**F**')
Ipomoea alata Rose, 1891
(type: specimen '**G**')
Operculina rhodocalyx A. Gray, 1892
(type: specimen '**H**')
Operculina roseana House, 1906
(type: specimen '**I**')
Merremia alata Rendle, 1906
(type: specimen '**J**')
Operculina hamiltonii var. *mucronata* Aust. & Stap., 1983

(type: specimen '**K**')

The following nomina nova have also been proposed, each typified by the same specimen as its basionym:

Ipomoea hamiltonii G. Don, 1838
(basionym: *Convolvulus alatus* Ham.)
Operculina rubicunda House, 1906
(basionym: *Ipomoea alata* Rose)
Operculina brownii Ooststr., 1939

(basionym: *Ipomoea alata* R. Brown)

In addition, the following relevant combinations have been published:

Convolvulus alatus (R. Brown) Spreng., 1819
Operculina turpethum (L.) Manso, 1836
Operculina alata (Ham.) Urban, 1902
Operculina hamiltonii (G. Don) Aust. & Stap., 1983

Solve the following problems:

7) None of the specimens '**C**' through '**K**' is congeneric with either '**A**' or '**B**' and '**E**' and '**J**' are not congeneric with the remainder. What is the correct name for the genus including '**C**', '**D**', '**F**' through '**I**', and '**K**'?

8) '**D**', '**F**', and '**G**' each represent distinct species of the genus just named. What are the correct names of these species?

9) '**H**' and '**I**' are now seen to belong to the same species as '**G**'. What is the correct name for this species with the new circumscription?

10) '**J**' is now seen to belong to the same genus as '**C**' and is not considered congeneric with '**E**'. What is the correct name for the species containing '**J**'?

11) '**F**' and '**K**' are considered to represent a single distinct variety of the same species as '**C**'. What are the correct names of the two varieties?

12) The temporary madness passes and you realize that, not only is '**J**' congeneric with '**E**', but that '**D**' also belongs in the same genus, as a distinct species. What is the correct name for this species now?

ANSWERS FOR SET 2. *OPERCULINA* MANSO

7) Operculina Manso

8) Operculina brownii Ooststr.
O. alata (Ham.) Urb.
O. rubicunda House

9) Operculina rhodocalyx A. Gray

10) Operculina '*your-choice*' 'Student'

11) Operculina turpethum (L.) Manso var. turpethum
O. turpethum (L.) Manso var. mucronata (Aust. & Stap.)
'Student'

12) Merremia brownii (Ooststr.) 'Student'

SET 3. *ACER* L. The Manitoba maple is a familiar weedy tree around Toronto. As one of the more widespread and variable North American tree species, it has prompted divergent taxonomic treatments. Its pinnately compound leaves, responsible for the common names ashleaf maple and boxelder, are so unlike those of most other familiar maples, that is has also been segregated generically from the more typical species. Not surprisingly, the different taxonomic treatments of this tree are reflected in varied nomenclatural treatments.

The following taxa have been described and associated with the corresponding types:

Acer L., 1753
(type: *A. pseudoplatanus* L.)
Negundo Blume, 1759
(type: *Vitex negundo* L., unrelated to *Acer*)
Negundo Boehm, 1760
(type: *A. negundo* L.)
Rulac Adanson, 1763
(type: *R. fraxinifolia* Adanson)

Acer pseudoplatanus L., 1753
(type: specimen '**A**')
A. negundo L., 1753
(type: specimen '**B**')
Negundo californicum Torr. & Gr., 1838
(type: specimen '**C**')
Acer negundo L. var. *violaceum* Jaeg. & Beissn., 1889
(type: specimen '**D**')

The following nomina nova have also been proposed, each typified by the same specimen as its basionym:

Rulac fraxinifolia Adanson, 1763
(basionym: *A. negundo* L.)
Negundo aceroides Moench, 1794
(basionym: *A. negundo* L.)
N. aceroides Moench var. *violaceum* Kirchn., 1864 (basionym: *N. californicum* Torr. & Gr.)
Acer interius Britt., 1908
(basionym: *A. negundo* var. *violaceum* J. & B.)

In addition, the following relevant combinations have been published:

Negundo negundo (L.) Boehm, 1760
Acer californicum (Torr. & Gr.) Dietr., 1840
A. negundo L. subsp. *californicum* (Torr. & Gr.) Wesm., 1890
A. negundo L. var. *californicum* (Torr. & Gr.) Sarg., 1891
A. negundo L. var. *violaceum* (Kirchn.) Schwer., 1893
Rulac negundo (L.) Hitchc., 1894
Acer negundo L. var. *interius* (Britt.) Sarg., 1919
Acer negundo L. subsp. *interius* (Britt.) A. & D. Löve, 1954

Solve the following problems:

13) Specimens '**B**', '**C**' and '**D**' all belong to a single species belonging to the same genus as specimen '**A**', but separate from the species containing it. What is the correct name of the species containing '**B**', '**C**' and '**D**'?

14) If the species containing specimens '**B**', '**C**' and '**D**' is considered generically separable from the species containing specimen '**A**', what is now its correct name?

15) What is the correct name of this species when we discover that *Negundo* Blume is not validly published?

16) If specimens '**B**', '**C**' and '**D**' each actually represent a different variety of a single species, what are the correct names of the varieties?

17) If the three varieties are now returned to the same genus as specimen '**A**', what are their correct names?

18) If their differences are considered more important and they are now treated as subspecies, what is the correct name for the subspecies typified by specimen '**D**'?

ANSWERS FOR SET 3. *ACER* L.

13) Acer negundo L.

14) Rulac negundo (L.) Hitchc.

15) Negundo aceroides Moench

16) Negundo aceroides Moench var. aceroides
N. aceroides Moench var. violaceum Kirchn.
N. aceroides Moench var. interius (Britt.) 'Student'

17) Acer negundo L. var. negundo
A. negundo L. var. californicum (Torr. & Gr.) Sarg.
A. negundo L. var. violaceum Jaeg. & Beissn.

18) Acer negundo L. subsp. interius (Britt.) A. & D. Löve

SET 4. *MANILKARA* Adans. (SAPOTACEAE). The tropical American sapodilla is the source of an edible fruit and of chicle, the latex used in chewing gum. A complicated mix of cultivated, wild, and naturalized races in different regions has led to varying taxonomic treatments. Furthermore, generic limits in the Sapotaceae are controversial and highly varied,
leading to divergent generic assignments by different authors.

The following taxa have been described and associated with the corresponding types:

Achras L., 1753
(type: *A. zapota* L.)
Sapota Mill., 1754
(type: *S. achras* Mill.)
Manilkara Adans., 1763

(type: *Mimusops kauki* L.)

Achras zapota L., 1753
(type: specimen '**A**')
Mimusops kauki L., 1753
(type: specimen '**B**')
Sloanea emarginata L., 1753
(type: specimen '**C**')
Achras zapota L. var. *zapotilla* Jacq., 1763
(type: specimen '**D**')
A. zapotilla (Jacq.) Nutt. var. *parvifolia* Nutt.,1849
(type: specimen '**E**')
Manilkara emarginata H.J. Lam, 1925

(type: specimen '**F**')

The following nomina nova have also been proposed, each typified by the same specimen as its basionym:

Sapota achras Mill., 1768
(basionym: *Achras zapota* L.)
Achras bahamensis Bak.,1888

(basionym:*A. zapotilla* var. *parvifolia* Nutt.)

In addition, the following relevant combinations have been published:

Achras zapotilla (Jacq.) Nutt., 1849
Sapota zapotilla (Jacq.) Cov., 1905
Manilkara parvifolia (Nutt.) Dub., 1915
M. emarginata (L.) Britt. & Wils., 1926
M. bahamensis (Bak.) Lam. & Meeuse, 1941
Achras emarginata (L.) Little, 1947
Manilkara zapota (L.) van Royen, 1953
M. achras (Mill.) Fosberg, 1964

Solve the following problems:

19) The genus *Manilkara* Adans. has been conserved against *Achras* L. when the two are combined. If specimen '**A**' is considered congeneric with specimen '**B**', what is the correct name for the sapodilla, the species containing specimen '**A**'?

20) If the wild-dilly (containing specimen '**C**') is also considered congeneric with specimens '**A**' and '**B**', what is its correct name?

21) What is the correct name for the wild-dilly if specimen '**E** is considered part of the same species?

22) If specimen '**D**' is considered to belong to a distinct species (the yabadilla) of the same genus as the others dealt with so far, what is the correct name of this species?

23) If the wild-dilly and sapodilla are considered generically distinct from specimen '**B**', what are their correct names?

24) If the wild-dilly is now considered a distinct variety of the same species as the sapodilla, what are the correct names of the two varieties?

25) If the yabadilla is considered to represent a third genus, what is its correct name?

ANSWERS FOR SET 4. *MANILKARA* Adans.

19) Manilkara zapota (L.) van Royen

20) Manilkara *'your choice'* 'Student'

21) Manilkara bahamensis (Bak.) Lam. & Meeuse

22) Manilkara zapotilla (Jacq.) 'Student'

23) Achras zapota L.
Achras emarginata (L.) Little

24) Achras zapota L. var. zapota
Achras zapota L. var. parvifolia (Nutt.) 'Student'

25) *'Your choice'* zapotilla (Jacq.) 'Student'

SET 5. *LIBOCEDRUS* ENDLICHER (CUPRESSACEAE). The incense cedars are so called because of their pleasantly fragrant wood. As originally circumscribed, *Libocedrus* was unusual among conifers in having species in both the northern and southern hemispheres. We're concerned here with the incense cedars found in the northern hemisphere.

The following names have been published and associated with the corresponding types:

Libocedrus Endlicher, 1847
(type: *L. plumosa* Endl.)
Calocedrus Kurz, 1873
(type: *C. macrolepis* Kurz)
Heyderia K. Koch, 1874
(type: *L. decurrens* Torr.)

Libocedrus plumosa Endlicher, 1847
(type: specimen '**A**')
Libocedrus decurrens Torrey, 1853
(type: specimen '**B**')
Calocedrus macrolepis Kurz, 1873
(type: specimen '**C**')
Libocedrus formosana Florin 1930
(type: specimen '**D**')
Libocedrus macrolepis (Kurz) Bentham var. *formosana* Kudo, 1931
(type: specimen '**E**')

In addition, the following relevant combinations have been published:

Heyderia decurrens (Torrey) K. Koch, 1874
Libocedrus macrolepis (Kurz) Bentham, 1880
Heyderia formosana (Florin) Li, 1953
Calocedrus decurrens (Torrey) Florin, 1956
Calocedrus formosana (Florin) Florin, 1956

Solve the following problems:

26) Specimen '**A**' represents a southern incense cedar while the other specimens are all northern. If the northern incense cedars belong to a genus distinct from the southern species, what generic name should be applied to the northern species?

27) If the southern and northern incense cedars belong to different sections of the same genus, what are the correct names of the two sections?

28) If specimens '**A**', '**B**', and '**C**' each belong to different genera, what are the correct names for the three species typified by these specimens?

29) If specimens '**D**' and '**E**' belong to the same species as specimen '**B**' but represent a different variety, what should the variety containing '**D**' and '**E**' be called?

30) If the northern incense cedars, '**B**' to '**E**', all represent different species of a single genus distinct from that containing specimen '**A**', what are the correct names for each of these four northern species?

ANSWERS TO SET 5. *LIBOCEDRUS* Endlicher

26) Calocedrus Kurz

27) Libocedrus Endl. sect. Libocedrus
Libocedrus Endl. sect. Calocedrus (Kurz) 'Student'

28) Libocedrus plumosa Endlicher
Heyderia decurrens (Torrey) K. Koch
Calocedrus macrolepis Kurz

29) Heyderia decurrens (Torrey) K. Koch var. formosana (Kudo) 'Student'

30) Calocedrus decurrens (Torrey) Florin
C. macrolepis Kurz
C. formosana (Florin) Florin
C. *'your choice'* 'Student'