PAPAVER IN NORTH AMERICA NORTH OF MEXICO[1]

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The following diagnostic treatment includes the native and introduced species of *Papaver* found in North America north of Mexico. It is primarily synthetic in nature and is based in large part on the works cited under "Literature," as well as on the collection of specimens in the United States National Herbarium, Smithsonian Institution. This treatment is not offered as a definitive revision, the achievement of which will require extensive study in the field, herbarium and laboratory. In some cases, existing collections are very inadequate, and this is especially true of the problematic scapose poppies. In view of the present confused situation with regard to the latter in North America, a broad species concept is here adopted for them. In this arctic and alpine complex many species of dubious merit have been proposed, some on the basis of only one or a few specimens and with little regard for the overall generic context. Much importance has been accorded chromosome numbers in some instances, but until the complex cytological patterns in *Papaver* are fully investigated and their relationships to morphological patterns analyzed, such data contribute little to sound taxonomic circumscriptions and dispositions.

When the native North American species of *Papaver* are better known, it is probable that some taxa herein submerged in broadly conceived species will be recognized separately at the specific and varietal levels. Until such time, however, practicality and fidelity to what is actually

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known about the native poppies seem best served by a synoptic approach utilizing these broad taxa. I have made no attempt to relate the introduced poppies to the many infraspecific taxa that have been proposed for those species in their native ranges. This would be virtually impossible on the basis of the morphologies of most individual plants found in North America. Any such correlations which could be made would be essentially meaningless in the North American context, within which, due to geographically random introductions and subsequent hybridizations, there is no biologically significant pattern of variation in evidence.

The sectional nomenclature utilized herein follows that presented in my recent review of the subject (Kiger, 1973). The circumscriptions and descriptions of sections generally follow the traditional ones of existing revisions, particularly that by Fedde (1909). Only characters of species found in North America north of Mexico are included in the sectional descriptions. The descriptions of all taxa follow the outline and glossary developed for Flora North America (Porter, *et al.*, 1973).

Papaver L., Sp. Pl., 506. 1753; Gen. Pl. ed. 5, 224. 1754.

Plants annual or perennial, herbaceous, caulescent, subscapose or scapose, monoclinous, sap gummy, opaque. Main stems eramous or ramose. Leaves alternate, sometimes basally rosulate; blades entire to bipinnatipartite. Flowers solitary, pedicellate or scapose, actinomorphic, complete, syncarpous, apostemonous. Sepals 2, free, caducous, entire. Petals 4, entire, aestivation corrugate. Stamens numerous. Carpels 3-18; styles absent; stigmas 3-18, sessile, radiate on a disc, interstigmatic membrane usually present, often conspicuous. Fruits capsular, dehiscence poricidal, pores subapical, 3-18, locules 3-18.

KEY TO SPECIES

a. Plants caulescent or rarely subscapose, at least a few cauline leaves present. b.
  b. Upper cauline leaves amplexicaulous. .... 1. *P. somniferum.*
  b. Upper cauline leaves not amplexicaulous. c.
    c. Ovaries and capsules setose. .. 5. *P. hybridum.*
    c. Ovaries and capsules glabrous. d.
      d. Plants perennial; stems eramous; petals 5 cm or more long. ..... 6. *P. orientale.*
      d. Plants annual; stems ramose; petals less than 5 cm long. e.
        e. Stigmatic disc depressed-conic, usually umbonate. ..... 4. *P. californicum.*
        e. Stigmatic disc essentially plane. f.
          f. Pedicels markedly patent hispid distally; capsules less than twice as long as broad. ..... 2. *P. rhoeas.*
          f. Pedicels strongly appressed hispid distally; capsules twice as long as broad. ..... 3. *P. dubium.*

a. Plants scapose, leaves all basal. g.
  g. Leaves entire to 3 (rarely 5)-lobed, essentially glabrous; capsules obovoid-obconic. ... 9. *P. walpolei.*
  g. Leaves pinnatipartite or bipinnatipartite with more than 5 lobes, variously vestite, at least when young; capsules narrowly clavate to globose. h.
    h. Setae on ovaries and capsules basally tuberculate. i.
      i. Petals salmon pink to yellow, paler basally; Rocky Mountains. ..... 7. *P. alpinum.*
      i. Petals white to rose with yellow basal spot; Alaska. ..... 8. *P. alboroseum.*
    h. Setae on ovaries and capsules not basally tuberculate. j.
      j. Stigmatic disc distinctly conic and/or umbonate. k.

k. Leaves mostly bipinnatipartite; capsule obovoid. ..... 11. *P. mcconnellii.*

k. Leaves mostly pinnatipartite; capsule narrowly oblong-cylindric to clavate. .... 10. *P. macounii.*

j. Stigmatic disc essentially plane. l.

l. Mature plants over 25 cm tall; petals 4-6 cm long; scapes glabrate to sparsely vestite. ..... 13. *P. nudicaule.*

l. Mature plants less than 25 cm tall; petals to 4 (rarely to 5) cm long; scapes moderately to densely vestite. .... 12. *P. lapponicum* ssp. *occidentale.*

SECT. PAPAVER

Plants annual, caulescent, glaucous, glabrate. Leaf blades simple or pinnatipartite. Basal leaves petiolate. Cauline leaves sessile, upper amplexicaulous. Filaments clavate. Stigmatic disc essentially plane. Fruits globose or subglobose, glaucous, glabrous.

1. **P. somniferum** L., Sp. Pl., 508. 1753.

Plants 3-15 dm tall. Main stems distally cauliramous, stout; branches few. Leaf blades simple and coarsely bidentate, or pinnatipartite with lobes irregularly dentate. Pedicels glabrate or sparsely pale setose distally. Petals white, pink, red or purple, darker spotted basally, 3.5-6.0 cm long. Filaments white; anthers pale yellow. Stigmas 5-18, disc margin deeply lobed, membrane conspicuous. Fruits usually stipitate, 3-9 cm long, not ribbed.

Adventive locally throughout the United States and Canada as far north as Newfoundland, introduced from Europe, native of Eurasia; fields, roadsides and waste places, especially about habitations; flowering June-September.

SECT. RHOEADES Bernh.

Plants annual, caulescent or subscapose, glabrous, pilose, hirsute, hispid or setose. Leaf blades pinnatipartite or bipinnatipartite. Basal leaves petiolate. Cauline leaves sessile, not amplexicaulous. Filaments filiform. Stigmatic disc essentially plane, sometimes umbonate, margin lobed, lobes rounded to obtuse. Fruits glabrous.

2. **P. rhoeas** L., Sp. Pl., 507. 1753.

Plants caulescent, hispid or setulose, 2.5-9.0 dm tall. Main stems distally cauliramous, slender to stout. Leaf blades pinnatipartite or bipinnatipartite, lobes acuminate, coarsely dentate. Cauline leaves often somewhat clustered beneath the pedicels. Pedicels sparsely to moderately patent hispid or setulose. Petals pink to red, sometimes darker spotted basally, 2.0-4.5 cm long. Filaments purple; anthers bluish. Stigmas 5-18, disc essentially plane, broader than capsule apex, membrane conspicuous. Fruits slightly stipitate or sessile, broadly obovoid or subglobose, 1-2 cm long, obscurely ribbed, glaucous.

Adventive locally throughout the United States and Canada as far north as Alaska, introduced from Europe; fields, roadsides and disturbed sites, especially about habitations; flowering March-October.

3. **P. dubium** L., Sp. Pl., 1196. 1753.

Plants caulescent or subscapose, 2-6 dm tall. Main stems basicauliramous, hirsute to hispid. Basal leaf blades pinnatipartite, glaucescent, hispid. Cauline leaf blades bipinnatipartite, glaucescent, hispid. Pedicels distally appressed hispid, proximally patent hispid. Petals red, sometimes darker spotted basally. Filaments purple; anthers violet. Stigmas 7-9, disc essentially plane. Fruits sessile or slightly stipitate, obovoid, L:W::2:1, usually distinctly ribbed, glaucous.

Naturalized locally throughout the contiguous United States, introduced from Europe; fields, roadsides, thickets, disturbed sites, especially near habitations; flowering May-August.

4. **P. californicum** A. Gray, Proc. Amer. Acad. 22: 313. 1887.

P. lemmonii Greene

Plants caulescent, glabrous or sparsely pilose, 3-6 dm tall. Main stems distally cauliramous, slender. Leaf blades pinnatipartite or bipinnatipartite, lobes sometimes dentate. Petals red, greenish spotted basally, 1-2 cm long. Filaments greenish yellow; anthers yellow. Stigmas 5-8, disc plane to depressed-conic, usually umbonate, not broader than capsule apex, membrane conspicuous. Fruits sessile, ellipsoid to obovoid-turbinate, 1-2 cm long.

Native, endemic to western California; chaparral and oak woodlands in the mountains at elevations below 800 m, especially in clearings, burns and other disturbed sites; flowering April-May.

Sect. Argemonidium Spach

Plants annual, caulescent, pilose, villous or hispid. Leaf blades pinnatipartite or bipinnatipartite. Basal leaves petiolate. Cauline leaves sessile, not amplexicaulous. Filaments clavate. Stigmatic disc convex and vaulted, lobes obtuse. Fruits setose.

5. **P. hybridum** L., Sp. Pl., 506. 1753.

P. apulum Ten. var. *micranthum* (Boreau) Fedde misappl.

Plants 1-5 dm tall. Main stems basiramous and cauliramous. Pedicels moderately to densely appressed to spreading hispid. Petals red, darker spotted basally. Filaments dark violet; anthers pale blue. Stigmas 4-8, disc deciduous at maturity. Fruits sessile, obovoid to subglobose,

1.0-1.5 cm long, obscurely to distinctly ribbed, vestiture recurved-arcuate, spreading or ascending.

Naturalized locally in California, introduced from Eurasia; fields, vineyards and disturbed sites; flowering March-May.

Specimens attributed to *P. apulum* var. *micranthum* in herbaria and reported as such in Munz and Keck (1959) and in Munz (1968) belong here.

SECT. OXYTONA Bernh.

Plants perennial, robust, caulescent, hispid. Leaf blades pinnatipartite. Basal leaves petiolate. Cauline leaves sessile, not amplexicaulous. Flowers very large. Filaments clavate. Stigmatic disc plane. Fruits subglobose, glaucous, glabrous.

6. **P. orientale** L., Sp. Pl., 508. 1753.

Plants 6-10 dm tall. Main stems eramous. Leaf lobes aristate. Pedicels moderately to densely appressed pale hispid. Petals pale orange, sometimes pale spotted basally, 5-8 cm long. Filaments purple; anthers violet. Stigmas 13-18. Fruits sessile, to 3.5 cm long.

Adventive locally in the middle-Atlantic United States, escaping from cultivation, introduced from Europe, native of southwest Asia; fields and disturbed sites; flowering in May.

Papaver bracteatum Lindl., which some consider distinct from *P. orientale*, has deep red petals and has foliaceous bracts subtending the sepals. It is occasionally cultivated and might be found as an escape.

SECT. LASIOTRACHYPHYLLA Bernh.

Plants perennial, scapose. Main stems eramous. Basal leaves petiolate, rosulate, blades simple, pinnatipartite or bipinnatipartite. Cauline leaves absent. Stigmatic disc plane to conic, sometimes vaulted, sometimes umbonate. Fruits setose.

7. **P. alpinum** L., Sp. Pl., 507. 1753.

P. pygmaeum Rydb.

P. nudicaule L. ssp. *radicatum* (Rottb.) Fedde var. *pseudocorydalifolium* Fedde

Plants cespitose. Leaf blades pinnatipartite or bipinnatipartite, glabrate or sparsely hispid. Scapes erect, to 10 cm tall, sparsely hirsute. Petals yellow to salmon pink, paler spotted basally, to 1 cm long. Stigmas usually 5, disc vaulted. Fruits obovoid-cylindric or ellipsoid, whitish setose, trichomes basally tuberculate.

Native to Montana, Alberta and British Columbia; talus slopes in the Rocky Mountains from 1500 to 2700 m; flowering July-August.

For discussion of the relationship of these plants to European and Asian members of the complex see D. Löve (1969).

8. **P. alboroseum** Hult., Fl. Kamtchatka 2, Sv. Vet.-Akad. Handl. ser. 3, 5, no. 2: 141, *t. 3*, f. c. 1928.

Plants cespitose, caudex short. Leaf blades bipinnatipartite, pale setose above and beneath, primary lobes 2-5-partite. Scapes arcuate-ascending, to 15 cm tall, setose. Petals white to rose, yellow spotted basally. Stigmas 5-6, disc essentially plane. Fruits ovoid to globose, ribbed, whitish to brown setose, trichomes basally tuberculate.

Native to the Kenai Peninsula, Alaska, also to Kamtchatka, U. S. S. R.; sandy and gravelly soils at low elevations.

9. **P. walpolei** Pors., Rhodora **41**: 231. 1939.

Plants densely cespitose. Leaf blades entire or pinnatipartite, subcoriaceous, glabrous, lobes (when present) 3, rarely 5, broadly obtuse, margins revolute, petiole bases conspicuously persistent. Scapes erect, to 16 cm tall, hirsute or hirtellous distally. Petals pale yellow or cream and

yellow spotted basally, to 2.5 cm long. Stigmas usually 5, disc conic, broader than capsule. Fruits obovoid-obconic, 1.5 cm long, pale yellowish setose or setulose, trichomes slender, basally tuberculate, sometimes only obscurely so.

Native to the Seward Peninsula, Alaska, also to northeastern Asia; tundra from sea level to ca. 800 m on mountain slopes in gravelly loam and solifluction soils, often of limestone origin; flowering May-August.

10. **P. macounii** Greene, Pittonia 3: 247. 1897.

P. keelei Pors.
P. alaskanum Hult. var. *macranthum* Hult.
P. scammianum D. Löve
P. hultenii Knaben
P. microcarpum DC., misappl.
P. nudicaule L., misappl.

Plants solitary to densely cespitose. Leaf blades pinnatipartite or rarely bipinnatipartite, glabrate to pilose. Scapes erect, to 4 dm tall, moderately pilose. Petals yellow. Stigmas 3-5, disc conic, umbonate, sometimes vaulted. Fruits narrowly oblong or clavate, L:W::2:1, setose, trichomes not basally tuberculate.

Native and widespread in Alaska, Yukon Terr., Northwest Terr. and British Columbia; sandy and gravelly soils, heaths, thickets, meadows, often on slopes, to over 2100 m.

11. **P. mcconnellii** Hult., Fl. Alaska & Yukon 5, Lunds Univ. Arssk. N. F. Avd. 2, **41**, no. 1: 803, *f. 1.* 1945.

Plants cespitose, to 15 cm tall. Leaf blades bipinnatipartite, rarely pinnatipartite, glaucous, sparsely pilose above and beneath. Scapes erect, pilose. Petals yellow. Stamens usually shorter than mature ovary. Stigmatic disc convex, distinctly apiculate-umbonate, membrane conspicuous. Fruits obovoid, pale setose, trichomes not basally tuberculate.

Endemic to Yukon Terr.; sandy and gravelly soils.

12. **P. lapponicum** (Tolm.) Nordh. ssp. *occidentale* (Lundstr.) Knaben, Op. Bot. 2, 3: 55. 1959.

P. radicatum Rottb. ssp. *lapponicum* Tolm.
P. radicatum ssp. *occidentale* Lundstr.
P. lapponicum ssp. *porsildii* Knaben
P. nudicaule L. ssp. *radicatum* (Rottb.) Fedde var. *coloradense* Fedde
P. nudicaule ssp. *radicatum* var. *columbianum* Fedde
P. kluanensis D. Löve
P. freedmanianum D. Löve
P. nigroflavum D. Löve
P. cornwallisensis D. Löve
P. alaskanum Hult. var. *alaskanum*
P. denalii Gjaerevoll
P. radicatum Rottb. ssp. *radicatum*, misappl.

Plants cespitose. Caudex short to elongate. Leaf blades mostly bipinnatipartite, pilose; petiole bases usually persistent, sometimes conspicuously so, pale to dark brown. Scapes ascending to erect, to 20 (rarely 25) cm tall, sparsely to moderately appressed to patent hispid or pilose. Petals yellow or rarely white. Stigmas 5-8, disc plane to slightly convex, sometimes vaulted. Fruits subglobose, ellipsoid or obovoid, setose, trichomes not basally tuberculate.

Native and widespread in arctic North America from Greenland to Alaska, extending southward in disjunct populations in the Rocky Mountains to Colorado and northern New Mexico at high elevations, also in Lapland; sandy and gravelly soils, often on talus, arctic and alpine tundra to ca. 3000 m.

For discussions of the proper typification of *P. radicatum* Rottb. and its bearing on the nomenclature in this complex see A. Löve (1962a, 1962b), Knaben (1958) and Knaben and Hylander (1970). The latter interpretation is here accepted. See D. Löve (1969) for discussion of the Rocky Mountain plants of this complex, held separate by her.

13. **P. nudicaule** L., Sp. Pl., 507. 1753.

Plants cespitose. Leaf blades pinnatipartite, less frequently bipinnatipartite, glabrate or setose. Scapes erect, 25-50 cm tall, stout, glabrate or sparsely hispid. Petals yellow, red or white. Stigmas 4-6, disc plane, membrane obsolescent. Fruits clavate or obovoid, setose, trichomes not basally tuberculate.

Adventive locally in Alaska and Yukon Terr., escaping from cultivation, native to arctic and alpine Asia; roadsides and disturbed sites, especially about habitations.

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