

## Re-recognition of *Rhynchospora wallichiana* (Cyperaceae) and Its Allies in Thailand

By

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**Abstract** Since C. B. Clarke (1893), *Rhynchospora wallichiana* has been treated with the synonym of *R. rubra* by all of the authors. Having new materials at hand from various localities in Thailand and adjacent regions, careful examination on the shape of achenes and the pubescence of leaves revealed that these two entities should be recognized as a species independent to each other.

During my botanical survey of Thailand in 1984, I have collected *Rhynchospora wallichiana* Kunth, which has been united with *R. rubra* (Lour.) Makino, from Doi Inthanon. The collection site of *R. wallichiana* is situated on the lower elevation of Doi Inthanon, where dry deciduous forest occurs. *Rhynchospora wallichiana* grows on sunny, grassy mountain-slopes in scattered forest. During a dry season, all of herbaceous plants in this forest have gone except for their thick rhizomes. On the other hand, *R. rubra* usually occurs in moist sites, where water has been supplied through the year. In addition, I have collected *R. hirticeps* (Kuekenh.) T. Koyama, which was described as a variety of *R. rubra*, from Phu Kradung which is famous for its flat top. The top areas of the mountain are mostly covered with grassy fields, where water has been supplied through the year. The clear difference of the habitat of these three entities made me to re-examine the morphological characters.

As shown in Fig. 1, achenes of *Rhynchospora rubra* are late-obovate in shape, ca. 1.50 mm long, ca. 1.25 mm wide and ca. 0.90 mm thick, and aculeate on shoulder; the projections are ca. 0.06 mm long; and those of *R. wallichiana* are sub-orbicular in shape, ca. 1.75 mm long, ca. 1.70 mm wide and ca. 0.90 mm thick, and aculeate on margin; the projections are ca. 0.03 mm long. On the other hand, achenes of *R. hirticeps* are obovate in shape, ca. 2.0 mm long, ca. 1.50 mm wide and ca. 1.00 mm in thick, and glabrous and smooth.

In *Rhynchospora*, corolla observed as bristles being antrorsely scabrous, are usually 6 and attach to the base of achenes (=hypogynous bristles). As shown in Table 1, they can be safely recognized as a distinct feature.

Involucral bracts of these entities are several, longer than the head, patent or

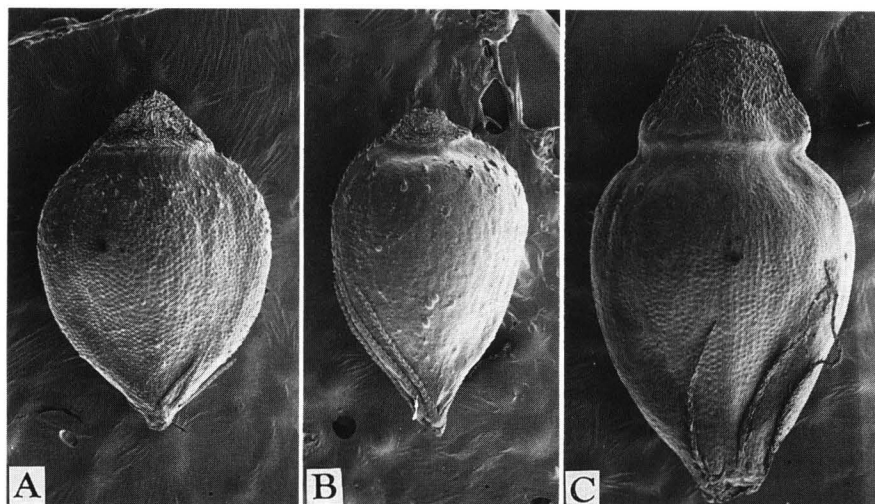


Fig. 1. Achenes of *Rhynchospora*. A: *R. wallichiana* from Koyama T-61199 (KYO), Chiang Mai, Thailand. B: *R. rubra* from Kawasaki s. n. (TNS), Chiba, Japan. C: *R. hirticeps* from Koyama et al. T-31327 (KYO), Loei, Thailand.

Table 1. Corolla observed in three entities.

	Corolla length	Ratio (corolla/achene)
<i>R. hirticeps</i>	ca. 1.75 mm long	Shorter
<i>R. rubra</i>	ca. 0.75 mm long	1/2
<i>R. wallichiana</i>	ca. 0.50 mm long	1/3

more or less reflexed, unequal, leafy, subulate-linear, scabrous margined at the upper half, dilated and ciliated at the lower part, up to 8 cm long. The cilia of bracts at the lower part are of multi-cellular hairs, 0.75–1.00 mm long in *R. wallichiana*, 0.50–0.75 mm long in *R. hirticeps* and 0.25–0.50 mm long in *R. rubra*. The hairs are most abundant in *R. hirticeps* and poor in *R. rubra*.

*Rhynchospora hirticeps* is characterized by having hairs on both leaves and scapes. On the other hand, *R. rubra* and *R. wallichiana* are characterized by having hairs on leaves beneath, but no hairs on scapes. In *R. hirticeps*, the hairs are patent, 0.50–0.75 mm long and occur not only on the main costa of leaves beneath, but also on the whole surface of leaves. In *R. rubra* and *R. wallichiana*, the hairs are observed only on the main costa and margin of leaves. In *R. rubra*, they are sometimes very short, tightly appressed, 0.05–0.10 mm long and in *R. wallichiana*, they are also short, outspread, 0.10–1.00 mm long.

As mentioned above, the features of achenes are well associated with the pubescence of leaves and bracts, and hypogynous bristles in each species. Therefore, I have come to the conclusion that these entities refer to the species as an

independent to each other.

**Key to the species (sect. *Haplostylis* in Thailand)**

- A. Scapes and leaves hairy. . . . . *R. hirticeps*
- A. Scapes glabrous and leaves hairy.
  - B. Achenes obovate to late-obovate, ca. 1.50 mm long, ca. 1.25 mm wide. . . . . *R. rubra*
  - B. Achenes sub-orbicular, ca. 1.75 mm long, ca. 1.70 mm wide. . . . . *R. wallichiana*

**1. *Rhynchospora hirticeps* (Kuekent.) T. Koyama**

Brittonia 31(2): 288 (1979). – *R. rubra* var. *hirticeps* Kuekent. in Engler, Bot. Jahr. Syst. 74: 495 (1949). Type from Philippines.

Specimens examined. Indoneasia: Celebes (9-1909 *Elbert* 3092 L). Kwangtung: Canton (6-1917 *Levine* 829 A), Hainan (9-1932 *Lei* 52 A, KYO). Hong Kong (6-1970 *Hu* 10406, 10547 A; 6-1940 *Taam* 1492 KYO). Papua New Guinea: Koitaki (4-1935 *Carr* 11910 A, L). Philippines: Luzon (11-1904 *Williams* 1552 A), Palawan (3/4-1951 *Edano* 14171 A). Singapore (? *Teruya* 1230 KYO). Sumatra (3-1957 *Meijer* 5657, 5670 L). Thailand [NE]: Loei (7-1959 *Smitinand* 5951 L; 9-1967 *Shimizu et al.* T-9038 KYO; 9-1969 *S. P. et al.* 73 L; 12-1982 *Koyama et al.* T-31327 A, KYO). [SE]: Chaburi (4-1959 *Smitinand* 5764 L). [PEN]: Phatthalung (5-1930 *Kerr* 19258 L), Satun (12-1927 *Kerr* 13688 L), Songkla (11-1984 *Maxwell* 84-443 A).

Habitat: on wet grassy fields and on wet grassy banks along streams, 600–1300 m alt.

Distribution: Papua New Guinea, Southeast Asia and southern China.

**2. *Rhynchospora rubra* (Lour.) Makino**

Bot. Mag. Tokyo 17: 180, fig. 1–2b (1903). – *Schoenus ruber* Lour., Fl. Cochinchina. 1: 41 (1790). Type from Cochinchina.

Specimens examined. Australia: Queensland (7-1948 *Brass* 19615 TNS), N. S. W. (8-1973 *Coveny* 5030 TNS). Borneo: Borneo (1938 *van Loenen* 11 A), Dallas (12-1931/32 *Clemens* 27679 A), Sarawak (9-1958 *Jacobs* s), Burnei (1-1964 *Hotta* 13160 KYO). Cambodia: Cheko (3-1965 *Kira et al.* 1150 KYO, TNS; 3-1965 *Kira et al.* 1405 KYO). Caroline Isl.: Palau isl. (9-1933 *Hosokawa* 6778, 6825 TNS), Yap isl. (7-1965 *Evans* 323 A). Chekiang (1888 *Faber* P). Dutch New Guinea: Waren (3-1940 *Kanehira & Hatusima* 12925 KYO). Fukien (8- 1924 *Chung* 2916 A). Hong Kong: Hong Kong (1853/56 *Wright* 596 A-〈with *R. hirticeps*〉, L, P; 1883/85 *Bon* 279, 482, 917, 923 P; 6- 1895 *Bodinier* 1223 L, P; 1937 *Endo* 36 TNS). India: Ceylon (8-1894 *Schiffner* 1650 L; *Walbar* L), Java (3-1935 *NIFS* 6664 A). Orient (*Wight* 2911 A, C), Nicobar Isl. (*Kamphovener* 2486, 2834 C; 9-1976 *Nair* 3578, 4536 L). Indonesia: Celebes (2-1929 *Kjellberg* 437 s; *van Balgooy* 3739 A), Moluccas (6-1938 *Buwalda* 5310 A), Soemba (12-1934 *de Voogd* 1854 A). Japan [Honshu]: Aichi (8-1890 *Ito* TNS; 1940 *Makino* 171578 A), Chiba (10-1936 *Okuyama* 9625 TNS; 9-1949 *Kawasaki* TNS; 8-1958 *Furuse* A, s), Gifu (8-1910 *Sakurai* 22 A; 8-1929 *Shiota* 2414 A), Hyogo (9-1916 *Matsushima* TNS; 10-1972 *Kurosaki* 4802 TNS), Mie (8-1950 *Kawasaki* TNS), Osaka (9-1896 *Matsuda* TNS), Okayama (9-1930 *Uno* 6473 A; 8-1958 *Namba* 5434 TNS), Shiga (9-1951 *Hashimoto* NSM-407 A, C, L, S, TNS; 10-1937 *Yamamoto* 3548 TNS), Shizuoka (10-1959 *Furuse* A, s; 11-1975 *Ookawa* TNS), Wakayama (9-1924 *Makino* 171588 A;

10-1931 *Ohwi & Tagawa 94* TNS; 10-1915 *Ui* TNS; 9-1936 *Numajiri* TNS), Yamaguchi (8-1892 *Nikai 678* TNS; 9-1949 *Okamoto 8* TNS). [Shikoku]: Kagawa (8-1934 *Ujii* TNS), Kochi (8-1892 *Watanabe* TNS; 10-1959 *Okuyama 15949* TNS). [Kyushu]: Kagoshima (8-1910 *Takeuchi* TNS; 9-1933 *Tagawa 1886* C, TNS; 9-1953 *Sasaki & Oouchiyama 10* TNS; 7-1954 *Oouchiyama 83* TNS), Miyazaki (8-1891 *Saida* TNS; 10-1938 *Komeda E76* A; 10-1949 *Nagasawa 515* TNS), Nagasaki (1862 *Oldham 913* A; 10-1906 *Tashiro* TNS; 9-1937 *Yokoo 35* TNS), Ohita (7-1935 *Yamaki 97413* TNS; 9-1935 *Yamaki 97970* TNS). [Ryukyu]: Okinawa (8-1894 *Ito 1036* TNS; 7-1950 *Amano 6080* A, TNS; 8-1956 *Fosberg 38303* L; 5-1956 *Fosberg 37168* L). Kiangsi: Kiangsi (8-1934 *Lau 4249* A, s). Kiangsu: Kiangsu (10-1933 *Migo 83* TNS). Kwangsi: Kwangsi (6-1933 *Tsang 22490* A, P, s; 9-1933 *Tsang 22817* P; 10-1933 *Steward & Cheo 1151* A, P, s; 7-1934 *Tsang 23941* A; 1936 *Wang 41038* KYO). Kwangtung: Hainan (6-1935 *How 72832* P, s; 9-1932 *Lei 52* P), Kwangtung (3-1888 *Clarke* P; 10-1916 *Merrill 10193* A; 7-1924 *Merrill 12801, 13018* P; 10-1916 *Levine 548* A; 6-1917 *Levine 776* A; 7-1924 *Peng et al. 12801* s; 8-1932 *Lau 20298* L; 9-1933 *Lau 2190* A; 10-1935 *Tsang 25618, 25673, 26008* A; 8-1935 *Kimura* KYO). Kweichow (7-1917 *Handel-Mazzetti 2128* C). Laos (4-1895 *Massie* P; 3-1937 *Petelot 5314* A, P). Malaya (5-1957 *Shah 21* A). Papua New Guinea: Aiyura (7-1977 *Conn & Akakauaro 403* A), Kadubaka (3-1958 *Bergman 368* s), Lae (12-1966 *Coode & Gillison 25434* A), Netherl (4-1959 *Wilde & Vervoort 379* A), Fergusson isl. (6-1956 *Brass 27243* s), Misima isl. (8-1956 *Brass 27686* s), Rossel isl. (11-1965 *Henty 27046* A; 10-1956 *Brass 28281* s). Philippines: Palawan (3-1947 *Edano 109* A). Singapore (10-1901 *Jensen* C; *Teruya 2134* KYO). Sumatra: Atjeh (1934 *van Steenis 6247* A), Bilah (2/3-1928 *Toroës 257* A; 7-1932 *Toroës 1785, 2124, 2663, 2746, 2801, 2859, 3057, 3093, 3180* A), Habinsaran (3-1929 *Loerzing 15443* A), Pajakumbuh (4-1957 *Meijer 5670* A), Toetoeapan (11-1933 *Boeëa 6055* A). Szechuan: Szechuan (7/8-1931 *Wang 23520* A, P). Taiwan: Taiwan (9-1914 *Faurie 53* P; 5-1934 *Odashima 17803* A, C, L, P, s, TNS; 7-1909 *Sasaki* TNS; 10-1925 *Sasaki* TNS; 11-1940 *Satake & Imazeki* TNS). Thailand [E]: Chaiyaphum (12-1971 *Beusekom et al. 4262* C, KYO, L). [SE]: Chanthaburi (8-1973 *Murata et al. T-17717* KYO, L), Khao Soi Dao (11-1969 *Beusekom & Smitinand 2147* A, C, KYO, L), Makham (10-1953 *Sangkhanchand 265* C, L; 8-1973 *Geesink & Phengkhai 6340* C, L), Trat (6-1952 *Smitinand 1332* L). Vietnam: Annam (7-1924 *Evard 1091* L), Cochinchina (1862/66 *Thorel* P; 1868 *Talmy* P-(with *R. submarginata*); 6-1961 *Kiet 223* P), Tonkin (2-1886 *Balansa 354* P; 11-1886 *Balansa 356* P; *Bon 6126* P; 8-1892 *Bon 9698* P; 10-1936 *Petelot 6101* A), Indo China (1911 *Lecomte & Finet 838* P). Yunnan: Yunnan (1900/20 *Cavalerie 790* P).

Habitat: on wet grassy fields along streams, 0–1200 m alt.

Distribution: Australia to Japan through SE-Asia and S-China.

### 3. *Rhynchospora wallichiana* Kunth

Enum. pl. 2: 289 (1837).

Firm and slender perennial. Culms solitary or loose tufts, 30–80 cm tall, 0.8–1.2 mm across, slender, obtusely three-angled, erect, smooth, leafy only at base, glabrescent. Leaves stiff, 5–8, basal; blade linear, 8–55 cm long, 1.5–2.5 mm wide, lightly green, acute at tip, gradually attenuate, glabrous on upper side, hairy on lower side and at margin; hairs white, antrorse, tuberculate at base; sheath 1–3 cm long, straw-coloured, occasionally short fibrous. Inflorescence capitate, solitary, terminal; heads globose or hemispheric, 12–14 mm across, chestnut-coloured, with sessile spikelets; involucre bracts leaflike, 2–8, spreading or reflex, with dense white hairs at margin, to ca. 7 cm long. Spikelets ca. 5 mm long, somewhat distichously 5–6 scaled, tawny-stramineous. Achenes light brown, sub-orbicular,

ca. 1.75 mm long, ca. 1.70 mm wide, flattened, ca. 1.00 mm thick, suddenly contracted at base, aculeate on margin; projections ca. 0.03 mm long. Style filiform, ca. 8 mm long, undivided or shortly bilobed at tip; the persistent style-base deltoid, ca. 0.20 mm long, ca. 0.75 mm wide, fulvescent. Hypogynous bristles on female flower, (5–)6, gracile, ca. 0.50 mm long, 1/3 as long as achene, antrorsely scabrous, rather hairy at base.

Specimens examined. Assam: Khasia (9-1954 *Chand* 8243 L; *J. D. H. & T. T. C.*, L), Assam (*Masters* L; *Jenkins* L; coll. without record 220 s). Bengal: East (*Griffith* 6301 C, L). Borneo: Kalimantan (2-1979 *Murata et al.* B-4543 KYO). Guam (9-1945 *Necker* 185 A). India (9-1950 *Mooney* 3993 A, L, 3995 A, L). Indonesia: Java (6-1932 *Suganda* 18 A). Kwangsi: Kwangsi (*Wang* 41038 A). Kwangtung: Hainan (6-1928 *Tsang* 17491 A), Sha Po Shan (8-1927 *Tsang et al.* 16028 s, A), Lin Fa Shan (8-1927 *Tsang et al.* 15773 s, A). Nepal: Nepal (*Wallich* 3422 L). Papua New Guinea: Papua New Guinea (1-1950 *Fryar* 3604 A; 2-1968 *Kairo & Encos* 35794 A). Philippines: Luzon (9-1913 *Ramos* 1453 A); Mindanao (8/9-1949 *Edano* 11033 A; 4/5-1927 *Ramos & Edano* 49521 s). Sumatra: Northern (3-1929 *Loerzing* 15443 L). Thailand [N]: Chiang Mai (12-1957 *Smitinand* 3998 L; 7-1958 *Sorensen et al.* 4487 C; 8-1988 *Koyama* T-61178 A, KYO; 8-1988 *Tsugaru* T-61855 KYO, TNS; 8-1988 *Koyama* T-61199 A, KYO; 8-1988 *Koyama* T-61184 KYO; 8-1988 *Tamura* T-60037 KYO; 8-1988 *Takahashi* T-62747 KYO, TNS; 12-1969 *Beusekom & Phengklai* 2518 C, KYO, L), Lamphun (9-1967 *Tagawa et al.* T-9211 KYO), Tak (7-1973 *Murata et al.* T-16799 KYO, TNS). [NE]: Loei (8-1988 *Koyama* T-61359 KYO, TNS), Nongkhai (8-1972 *T. S.* 11648 L). [E]: Surin (10-1984 *Murata et al.* T-37710 KYO). [SW]: Kanchanaburi (7-1946 *Kostermans* 1268 A, C, L, s). Vietnam: Tonkin (10-1908 *Alleizette* L). Yunnan: Che-li Hsien (9-1936 *Wang* 76735 A), Jenn-yeh Hsien (10-1936 *Wang* 80425 A), Ping-pien Hsien (7- 1934 *Tsai* 61116 A).

Habitat: on dry grounds at edge of small ponds along road in sunny places, common in muddy places between short grass, but scattered an usually solitary or a few together, and on dry slopes in rather open dry dipterocarp forests, elevation from 200 m to 1100 m.

Distribution: Assam, Bengal, India, Nepal, Indoneasia, Papua New Guinea, Southeast Asia, Southern China and Guam.

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Several authentic specimens in addition to general collections from Southeast Asia and adjacent countries were also observed in the Harvard University Herbaria (A), U.S.A., in the Forest Herbarium (BKF), Thailand, in the Museum of Natural History at Copenhagen (C), Denmark, at Leiden (L), Netherlands, at Paris (P), France and at Stockholm (S), Sweden. I wish to express my hearty thanks to the directors and curators of the herbaria mentioned for their kind aid during my visit.

## References

- Clarke, C. B., 1893. Cyperaceae in Hooker, J. D. ed., *Fl. Brit. Ind.* 6: 585–672. The other references are cited in the synonymic lists of each species.

### Appendix

The following specimens are sometimes identified as *R. rubura*, but are quite different by having oblong achenes ornamented by scattered papillae, ca. 2.50 mm long, ca. 0.75 mm wide, and hypogynous bristles being longer than achene, ca. 3.00 mm long.

#### ***Rhynchospora submaginata* Kuekent.**

Engler, Bot. Jahrb. 74: 498 (1949).

Specimens examined. Kwangtung: Hainan (5-1936 *Lau 24768* KYO). Thailand [PEN]: Narathiwat (9-1987 *Niyomdham & Sriboonma 1557* KYO), Phatthalung (8-1967 *Shimizu et al. T-8133* KYO, TNS). [SE] Chanthaburi: Makham (8-1973 *Geesink & Phengklai 6335* KYO), between Chantaburi and Trat (9-1972 *Larsen et al. 32425* KYO).

Habitat: on red clayey grounds in open swampy places, swam with low vegetation on podsoilic soil, base of plant submerged.

Distribution: India, S-China, Thailand, Tonkin, Malay Peninsula, Sumatra and N-Australia.