

A DISTRIBUTIONAL AND CYTOLOGICAL SURVEY OF THE PRESENTLY RECOGNIZED TAXA OF *HIBISCUS* SECTION *FURCARIA* (MALVACEAE)

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Summary: Wilson, F. D. 2006. A distributional and cytological survey of the presently recognized taxa of *Hibiscus* section *Furcaria* (Malvaceae). *Bonplandia* 15(1-2): 53-62. ISSN: 0524-0476.

Hibiscus section *Furcaria* is a natural group of plants that presently includes 109 recognized taxa. Taxa are found in subsaharan Africa, India, southeastern Asia, Malesia, Australia, islands of the Pacific basin, the Caribbean, North, Central, and South America. The basic chromosome number is $x = 18$. In nature, ploidy levels range from diploid to decaploid. The taxa exhibit a remarkable amount of genome diversity. At least 13 genomes have been identified, some distributed widely and others with more restricted distributions. No modern taxonomic monograph of *Hibiscus* section *Furcaria* exists, but a number of regional studies have appeared that are essentially global in extent. Also, a number of studies of chromosome numbers and genome relationships have been published. The present paper includes a census of all the presently accepted taxa, the geographical distribution of each taxon, and chromosome numbers and genome designations of the 49 taxa for which the information is available. Important mechanisms of speciation include genome divergence at the diploid level, followed by hybridization and allopolyploidy, significant species radiation at the tetraploid and hexaploid levels, and the development of even higher levels of allopolyploids.

Key words: *Hibiscus*, *Furcaria*, Malvaceae, taxonomy, geographical distribution, chromosomes, genomes.

Resumen: Wilson, F. D. 2006. Distribución y citología de los taxones reconocidos actualmente de *Hibiscus* sección *Furcaria* (Malvaceae). *Bonplandia* 15(1-2): 53-62. ISSN: 0524-0476.

Hibiscus sección *Furcaria* es un grupo natural de plantas que actualmente incluye 109 taxones reconocidos. Los taxones habitan en África al sur del Sahara, India, sudeste de Asia, Malasia, Australia, Islas del Pacífico, el Caribe, América del Norte, Central y Sudamérica. El número básico de cromosomas es $x = 18$. En la naturaleza, los niveles de ploidía varían de diploide a decaploide. Los taxones exhiben una remarcable diversidad genómica. Han sido identificados al menos 13 genomas, algunos distribuidos ampliamente y otros con distribución más restringida. No existen monografías taxonómicas modernas de *Hibiscus* sección *Furcaria*, pero se han efectuado cierto número de estudios regionales que son esencialmente de nivel global. También se han publicado estudios de números cromosómicos y relaciones genómicas. El presente artículo incluye un listado de todas los taxones aceptados actualmente, la distribución geográfica de cada taxón, números cromosómicos y la designación de los genomas de 49 taxones para los cuales existe información disponible. Los mecanismos más importantes de especiación incluyen la divergencia genómica a nivel diploide, seguida por hibridación y alopoliploidía, una significativa radiación de las especies a niveles tetraploide y hexaploide, y aún el desarrollo de niveles mayores de alopoliploides.

Palabras clave: *Hibiscus*, *Furcaria*, Malvaceae, taxonomía, distribución geográfica, cromosomas, genomas.

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Hibiscus section *Furcaria* is a natural group of plants that presently includes 109 recognized taxa (Table 1). This section is set apart from the other sections of the large genus *Hibiscus* by each of the five calyx lobes having a prominent, thickened midrib and two thickened marginal ribs (Hochreutiner 1900; illustrated in Wilson 1994). Two species well known to commerce are kenaf, *H. cannabinus*, a paper-pulp and cordage fiber plant, and roselle, *H. sabdariffa*, which includes both fiber-bearing cultivars and those from which the fleshy calyces are utilized for food and drink. A number of species are grown as ornamentals or have ornamental potential with their large, showy, colorful flowers. A red-leaved cultivar of *H. acetosella* is also grown for its attractive foliage.

Hochreutiner (1900) published the last comprehensive taxonomic monograph of *Hibiscus*. No modern comprehensive monograph is available for *Hibiscus* section *Furcaria*. However, several regional publications have appeared in the last several years that in sum are essentially global in extent. Wilson

(1974), Wilson & Craven (1995), and Craven & al. (2003) published papers on the Australian taxa. Wilson (1993) treated the taxa that occur in the Pacific Basin. Wilson (1999) dealt with the African, Asian and Malesian taxa. Menzel & al. (1983a), Fuertes (1992), Fryxell & Krapovickas (2004), Krapovickas & Fryxell (2004) and Krapovickas (2006) published on the American taxa. The present paper includes a census of all presently accepted taxa and references to the original papers that include keys, typification, descriptions, synonymies, geographical distributions, chromosome data, and illustrations.

Geographical distribution: *Hibiscus* section *Furcaria* has a distribution from 35 deg. N in the southeastern United States (*H. aculeatus*) to 32 deg. S in South America (*H. diversifolius* subsp. *rivularis*), to 34 deg S in Africa (*H. diversifolius* subsp. *diversifolius*) and to 35 deg. S in Australia and New Zealand (*H. diversifolius* subsp. *diversifolius*) (Table 2).

Table 1. The recognized taxa of *Hibiscus* section *Furcaria*, 2006

Taxon	Reference
<i>H. acetosella</i> Welw. ex Hiern	Wilson 1999
<i>H. aculeatus</i> Walt.	Menzel & al. 1983a
<i>H. adscensionis</i> Fryxell & Krapov.	Fryxell & Krapovickas 2004
<i>H. altissimus</i> Hornby	Wilson 1999
<i>H. amambayensis</i> Krapov. & Fryxell	Krapovickas & Fryxell 2004
<i>H. andersonii</i> Krapov. & Fryxell	Krapovickas & Fryxell 2004
<i>H. aneutha</i> Craven, F. D. Wilson & Fryxell	Craven & al. 2003
<i>H. aphelus</i> Craven, F. D. Wilson & Fryxell	Craven & al. 2003
<i>H. arnhemensis</i> F. D. Wilson	Wilson 1974
<i>H. asper</i> Hook.f.	Wilson 1999
<i>H. australensis</i> Fosberg	Wilson 1993
<i>H. bacalusius</i> Craven, F. D. Wilson & Fryxell	Craven & al. 2003
<i>H. benensis</i> Fryxell & Krapov.	Fryxell & Krapovickas 2004
<i>H. berberidifolius</i> A. Rich.	Wilson 1999
<i>H. bifurcatus</i> Cav.	Krapovickas & Fryxell 2004
<i>H. brackenridgei</i> A.Gray subsp. <i>brackenridgei</i>	Wilson 1993

Taxon	Reference
<i>H. brackenridgei</i> subsp. <i>mokuleianus</i> (Roe) D. Bates	Wilson 1993
<i>H. brackenridgei</i> subsp. <i>molokaianus</i> (Rock ex Caum) F. D. Wilson	Wilson 1993
<i>H. byrnesii</i> F. D. Wilson	Wilson 1974
<i>H. cabralensis</i> Krapov.	Krapovickas 2006
<i>H. cannabinus</i> L.	Wilson 1999
<i>H. capitalensis</i> Krapov. & Fryxell	Krapovickas & Fryxell 2004
<i>H. chancoae</i> Krapov. & Fryxell	Krapovickas & Fryxell 2004
<i>H. chapadensis</i> Krapov. & Fryxell	Krapovickas & Fryxell 2004
<i>H. commixtus</i> Fryxell & Krapov.	Fryxell & Krapovickas 2004
<i>H. conceptionis</i> Fryxell & Krapov.	Fryxell & Krapovickas 2004
<i>H. costatus</i> A. Rich.	Menzel & al. 1983a
<i>H. cuanzensis</i> Exell & Mendonca	Wilson 1999
<i>H. cucurbitaceus</i> A. St.-Hil.	Krapovickas & Fryxell 2004
<i>H. divaricatus</i> Grah.	Wilson & Craven 1995
<i>H. diversifolius</i> Jacq. subsp. <i>diversifolius</i>	Wilson 1999
<i>H. diversifolius</i> subsp. <i>rivularis</i> (Bremek. & Oberm.) Exell	Wilson 1999
<i>H. elongatifolius</i> Hochr.	Wilson 1999
<i>H. fallax</i> Craven, F. D. Wilson & Fryxell	Craven & al. 2003
<i>H. ferreriae</i> Fryxell & Krapov.	Fryxell & Krapovickas 2004
<i>H. fijiensis</i> F. D. Wilson	Wilson 1993
<i>H. flagelliformis</i> A. St.-Hil.	Krapovickas & Fryxell 2004
<i>H. flavo-roseus</i> Baker f.	Wilson 1999
<i>H. forsteri</i> F. D. Wilson	Wilson & Craven 1995
<i>H. fryxellii</i> Mabberley var. <i>fryxellii</i>	Craven & al. 2003
<i>H. fryxellii</i> var. <i>mollis</i> Craven, F. D. Wilson & Fryxell	Craven & al. 2003
<i>H. furcatus</i> Willd.	Wilson 1999
<i>H. furcellatoides</i> Hochr.	Wilson 1999
<i>H. furcellatus</i> Desr.	Krapovickas & Fryxell 2004
<i>H. gillettii</i> De Wild. subsp. <i>gillettii</i>	Wilson 1999
<i>H. gillettii</i> subsp. <i>hiernianus</i> (Exell & Mendonca) F. D. Wilson	Wilson 1999
<i>H. gillettii</i> subsp. <i>lundaensis</i> (Baker f.) F. D. Wilson	Wilson 1999
<i>H. goossensii</i> (Hauman) F. D. Wilson	Wilson 1999
<i>H. greenwayi</i> Baker f.	Wilson 1999
<i>H. gregoryi</i> Krapov. & Fryxell	Krapovickas & Fryxell 2004
<i>H. hasslerianus</i> Hochr.	Krapovickas & Fryxell 2004
<i>H. henningsianus</i> Gürke	Krapovickas & Fryxell 2004
<i>H. heterophyllus</i> Vent.	Wilson & Craven 1995
<i>H. hilarianus</i> Krapov. & Fryxell	Krapovickas & Fryxell 2004
<i>H. hispidissimus</i> Griff.	Wilson 1999
<i>H. hochreutineri</i> Krapov. & Fryxell	Krapovickas & Fryxell 2004

Taxon	Reference
<i>H. hoshiarpurensis</i> T. K. Paul & M. P. Nayar	Wilson 1999
<i>H. inimicus</i> Craven, F. D. Wilson & Fryxell	Craven & al 2003
<i>H. iterapinensis</i> Krapov. & Fryxell	Krapovickas & Fryxell 2004
<i>H. kenneallyi</i> Craven, F. D. Wilson & Fryxell	Craven & al. 2003
<i>H. kitaibelifolius</i> A. St.-Hil.	Krapovickas & Fryxell 2004
<i>H. laxiflorus</i> A. St.-Hil.	Krapovickas & Fryxell 2004
<i>H. maculatus</i> Lam.	Menzel & al. 1983a
<i>H. marenitensis</i> Craven, F. D. Wilson & Fryxell	Craven & al. 2003
<i>H. Mariae</i> Krapov.	Krapovickas 2006
<i>H. mastersianus</i> Hiern	Wilson 1999
<i>H. matogrossensis</i> Krapov. & Fryxell	Krapovickas & Fryxell 2004
<i>H. mechowii</i> Garcke	Wilson 1999
<i>H. menzeliae</i> F. D. Wilson	Wilson & Byrnes 1970
<i>H. meraukensis</i> Hochr.	Wilson 1974
<i>H. minutibracteolus</i> F. D. Wilson	Wilson 1974
<i>H. moxicoensis</i> Baker f.	Wilson 1999
<i>H. multiformis</i> A. St.-Hil.	Krapovickas & Fryxell 2004
<i>H. nanuzae</i> Krapov. & Fryxell	Krapovickas & Fryxell 2004
<i>H. nigricaulis</i> Baker f.	Wilson 1999
<i>H. noldeae</i> Baker f.	Wilson 1999
<i>H. paludicola</i> Fryxell & Krapov.	Fryxell & Krapovickas 2004
<i>H. partitus</i> (Hochr.) F. D. Wilson	Wilson 1999
<i>H. parvilobus</i> F. D. Wilson	Wilson 1999
<i>H. peruvianus</i> R.E.Fr.	Krapovickas & Fryxell 2004
<i>H. petherickii</i> Craven, F. D. Wilson & Fryxell	Craven & al. 2003
<i>H. pohlii</i> Gürke	Krapovickas & Fryxell 2004
<i>H. radiatus</i> Cav.	Wilson 1999
<i>H. reekmansii</i> F. D. Wilson	Wilson 1999
<i>H. reflexus</i> Craven, F. D. Wilson & Fryxell	Craven & al. 2003
<i>H. riceae</i> Craven, F. D. Wilson & Fryxell	Craven & al. 2003
<i>H. rostellatus</i> Guill. & Perr.	Wilson 1999
<i>H. sabdariffa</i> L.	Wilson 1999
<i>H. saddii</i> Krapov. & Fryxell	Krapovickas & Fryxell 2004
<i>H. saponarius</i> Craven	Wilson & Craven 1995
<i>H. scotellii</i> Baker f.	Wilson 1999
<i>H. sebastianii</i> Fuertes	Fuertes 1992
<i>H. sineaculeatus</i> F. D. Wilson	Wilson 1999
<i>H. sparseaculeatus</i> Baker f.	Wilson 1999
<i>H. splendens</i> Fraser ex Grah.	Wilson & Craven 1995
<i>H. squarulosus</i> Craven, F. D. Wilson & Fryxell	Craven & al. 2003

Taxon	Reference
<i>H. stewartii</i> Craven, F. D. Wilson & Fryxell	Craven & al. 2003
<i>H. subdiversifolius</i> Hochr.	Wilson 1999
<i>H. sudanensis</i> Hochr.	Wilson 1999
<i>H. superbus</i> C. A. Gardner	Craven & al. 2003
<i>H. surattensis</i> L.	Wilson 1999
<i>H. symonii</i> F. D. Wilson	Wilson & Byrnes 1970
<i>H. thegaleus</i> Craven, F. D. Wilson & Fryxell	Craven & al. 2003
<i>H. torrei</i> Baker f.	Wilson 1999
<i>H. trilineatus</i> A. St.-Hil. & Naudin	Krapovickas & Fryxell 2004
<i>H. uncinellus</i> DC.	Fryxell & Wilson 1986
<i>H. wilsonii</i> Fryxell	Fryxell 1973
<i>H. windischii</i> Krapov. & Fryxell	Krapovickas & Fryxell 2004
<i>H. zonatus</i> F. Muell.	Wilson 1974

Chromosome numbers and genome designations

The basic chromosome number is $x = 18$ in the 49 taxa that have been counted (Table 2). Margaret Y. Menzel, her colleagues and students published a series of papers that established genome relationships among most of the taxa available in her collection (Wilson 1994). In nature are found diploid and the allopolyploid series of tetraploid, hexaploid, octoploid, and decaploid taxa. This group displays a remarkable amount of genome diversity. Thirteen genomes have been identified (A, B, C, D, E, G, H, J, P, R, V, X, and Y). Sub-Saharan Africa is the center of genome diversity; nine of the 13 genomes (A, B, C, D, E, G, H, X and Y) and nine of the 10 confirmed diploid species are found in sub-Saharan Africa (all except *H. costatus* of Cuba, Central America and Mexico) (Wilson 1994).

The “G” genome (or a modified G genome) is widely distributed. Found only in one diploid species in Africa, *H. sudanensis*, it is also found in an African tetraploid species, *H. rostellatus*, and in African and Indian octoploid species, New World tetraploid and decaploid species, and Australian and Malesian hexaploid species. (Craven & al.

2003; Fernández & al. 2003; Lavia & Fernández 2004; Menzel & al. 1983a; Menzel & Martin 1970, 1980; Wilson 1994). Electrophoretic data suggest that the G genome occurs also in the Hawaiian octoploid, *H. brackenridgei* subsp. *mokuleainus* (Menzel & Hancock 1984). Because of the striking morphological similarity among the American taxa, and among the Australian taxa, it seems likely that chromosome numbers and genome formulae will prove to be the same in the unanalyzed taxa as in the analyzed ones (American: 36, GP; Australian: 54, G_aJV).

The A, X, and Y genomes are restricted to Africa (except for some adventive and cultivated species that originated in Africa) and occur only in diploid and tetraploid taxa (Menzel & al. 1983b; Menzel & Martin 1970; Menzel & Wilson 1961, 1966, 1969). The B genome, represented by the single wide-ranging diploid species in Africa, Asia and Malesia, *H. surattensis*, also occurs in African and Asian tetraploids and octoploids (Menzel & Hancock 1984; Menzel & Martin 1970; Menzel & Wilson 1961, 1966, 1969). The C, D, and E genomes occur in the two subspecies of *H. diversifolius* and in the American decaploid, *H. maculatus* (the latter also carries the apparently unique R genome) (Menzel & Hancock 1984). There is also a possibility that the C, D, E, and G genomes

occur in the Fijian decaploid, *H. fijiensis* (Wilson 1993). The H genome is apparently unique to the African tetraploid, *H. rostellatus* (Menzel & Martin 1970). The J genome, found in the Australian hexaploids, is apparently also present in the Hawaiian octoploid *H. brackenridgei* subsp. *mokuleianus* (Menzel & Hancock 1984). The P genome is apparently unique to the American tetraploid species (Menzel & al. 1983a) and the V genome is apparently unique to the Australian

hexaploid species (Menzel & Martin 1980).

Thus, in *Hibiscus* section *Furcaria*, important mechanisms of speciation have been genome divergence at the diploid level, followed by extensive hybridization and allopolyploidy, significant species radiation at the tetraploid level (the American GP species), and at the hexaploid level (the Australian G_a JV species), and even the emergence of octoploid and decaploid species (Wilson 1994).

Table 2. Chromosome numbers, genomes and geographic distribution of recognized taxa of *Hibiscus* section *Furcaria*, 2006

Taxon	Chromosome number (n)	Genome(s)	Geographic Distribution
Africa, Asia and Malesia			
<i>H. acetosella</i>	36	AB	African origin; widely distributed cultigen
<i>H. altissimus</i>	72	BG _s UU ¹	S. E. Africa
<i>H. asper</i>	18	A	Widely distributed in subsarahan Africa
<i>H. berberidifolius</i>	18	U	Mountains of E. Africa
<i>H. cannabinus</i>	18	A	Widely distributed in subsaharan Africa, cultivated in Africa and elsewhere
<i>H. cuanzensis</i>	U	-	Angola; narrow endemic
<i>H. diversifolius</i> subsp. <i>diversifolius</i>	72	CDEG _d	Subsaharan Africa [also Philippines, Australia, New Guinea, New Zealand, Pacific islands, Central America, W. South America]
subsp. <i>rivularis</i> ²	72	CDEG _d	E. And S.E. Africa from Uganda to Botswana [also E. Brazil]
<i>H. elongatifolius</i>	U	-	Cameroon; narrow endemic
<i>H. flavo-roseus</i>	U	-	Angola; narrow endemic
<i>H. furcatus</i>	U	-	India and Thailand
<i>H. furcellatoides</i>	U	-	Guinea; narrow endemic
<i>H. gillettii</i> subsp. <i>gillettii</i>	U	-	Democratic Republic of Congo, Angola and Zambia
subsp. <i>hiernianus</i>	18	X _{hic} ³	Angola and Zambia
subsp. <i>lundaensis</i>	U	-	Angola; narrow endemic
<i>H. goossensii</i>	U	-	Democratic Republic of Congo; endemic
<i>H. greenwayi</i>	18	A	Uganda, Kenya and Tanzania
<i>H. hispidissimus</i>	72	BGUU	India and Sri Lanka; adventive in South Africa
<i>H. hoshiarpurensis</i>	U	-	N. W. India
<i>H. mastersianus</i>	18	X _{mas} ³	S., S.W. Africa; adventive in India
<i>H. mechowii</i>	18	Y _{mec} ³	C. And S. Africa; disjunct in extreme W. Africa [adventive in Venezuela]
<i>H. moxicoensis</i>	U	-	Angola; narrow endemic
<i>H. nigricaulis</i> ⁴	18	X	southern Africa: from Angola, Zambia & Mozambique to South Africa

Taxon	Chromosome number (n)	Genome(s)	Geographic Distribution
<i>H. noldeae</i>	36	UU	W. to E.C. Africa
<i>H. partitus</i>	U	-	C. and N. Madagascar
<i>H. parvilobus</i>	U	-	Kenya; narrow endemic
<i>H. radiatus</i>	36	AB	Indian in origin, now a widely cultivated ornamental
<i>H. reekmansii</i>	U	-	E. Democratic Republic of Congo, Rwanda, Burundi and W. Tanzania
<i>H. rostellatus</i>	36	GH	W. to E. C. Africa
<i>H. sabdariffa</i>	36	AY	Wild form: Angola, Ghana, Niger, Nigeria Cultivated forms: widely grown in tropics and sub-tropics
<i>H. scotellii</i>	U	-	Sierra Leone, Ivory Coast and Mali
<i>H. sineaculeatus</i>	U	-	Nigeria
<i>H. sparseaculeatus</i>	U	-	S. Somalia, Ethiopia to N. Tanzania
<i>H. subdiversifolius</i>	U	-	Madagascar
<i>H. sudanensis</i>	18	G	C. Africa, Cameroon to Democratic Republic of Congo
<i>H. surattensis</i>	18	B	Widespread in subsaharan Africa, the Indian subcontinent, S. E. Asia and Malesia
<i>H. torrei</i>	U	-	S. Tanzania to N. Mozambique
Australia			
<i>H. aneuthe</i>	U	-	N. T.: Jim Jim Creek, Alligator River
<i>H. aphelus</i>	54	UUU	W. A.: E. Kimberleys
<i>H. arnhemensis</i>	54	G _a JV	N. T.: E. Alligator River
<i>H. bacalusius</i>	U	-	N. T.: Middle Daly River
<i>H. byrnesii</i>	54	G _a JV	N. T.: E. of Pine Creek
<i>H. diversifolius</i> subsp. <i>diversifolius</i>	72	CDEG _d	E. Queensland, E. N.S.W. to 35 deg. S
<i>H. divaricatus</i> ⁵	54	G _a JV	E. Queensland, 25-26 deg. S
<i>H. fallax</i>	U	-	NT: N. & N.W. areas
<i>H. forsteri</i>	U	-	N. Queensland, Cook Dist.
<i>H. fryxellii</i> var. <i>fryxellii</i> var. <i>mollis</i> ⁶	54	G _a JV	W. A.: S. Kimberleys, far W. N. T.
<i>H. heterophyllus</i>	54	G _a JV	Queensland, N.S.W., 17-34 deg. S
<i>H. inimicus</i>	U	-	N. T.: Arnhem Land
<i>H. kenneallyi</i>	U	-	W. A.: coastal area of Kimberleys
<i>H. marenitensis</i>	54	UUU	W. A.: coastal area of Kimberleys
<i>H. menzeliae</i>	54	G _a JV	N. T.: Katherine Gorge
<i>H. meraukensis</i>	54	G _a JV	Widespread: N. Queensland, northern N. T., E. Kimberleys [also New Guinea, Moluccas]
<i>H. minutibracteolus</i>	54	UUU	W. A.: Kalumburu
<i>H. petherickii</i>	U	-	N. T.: N.W. part of Top End
<i>H. reflexus</i>	54	UUU	W. A.: N. Kimberleys
<i>H. riceae</i>	U	-	N. T.: Arnhem Land
<i>H. sabdariffa</i>	36	AY	Naturalized in north-western Australia
<i>H. saponarius</i>	U	-	N. Queensland, Cape York Peninsula

Taxon	Chromosome number (n)	Genome(s)	Geographic Distribution
<i>H. splendens</i>	54	G _a JV	E. Queensland, N.S.W., 18-33 deg. S.
<i>H. squarulosus</i>	U	-	W. A.: S.E. Kimberleys
<i>H. stewartii</i>	U	-	W. A.: W. Kimberleys
<i>H. superbus</i>	54	UUU	W. A.: N. & W. Kimberleys
<i>H. symonii</i>	54	G _a JV	N. T.: Alligator River
<i>H. thegaleus</i>	U	-	N. T.: N. Arnhem Land
<i>H. zonatus</i>	U	-	N. T.: widespread; N. W. Queensland
Islands of the Pacific Ocean			
<i>H. australensis</i>	U	-	Tubuai (Austral Islands)
<i>H. brackenridgei</i>	U	-	Hawaii
subsp. <i>brackenridgei</i>			
subsp. <i>mokuleianus</i>	72	G _b JVU	Hawaii
subsp. <i>molokaianus</i>	U	-	Hawaii
<i>H. diversifolius</i> subsp. <i>diversifolius</i>	72	CDEG _d	E. Pacific islands bet. 10-35 deg S, W. Pacific islands bet. 0-15 deg. N
<i>H. fijiensis</i>	90	CDEGU?	Fiji
<i>H. furcellatus</i>	36	GP	Hawaii [also S. Florida, Caribbean, S. Mexico, Central America, widespread in South America]
United States, Mexico, Central America and the Caribbean			
<i>H. aculeatus</i>	36	GP	S.E. U. S., Louisiana to N. Carolina, including N. Florida
<i>H. bifurcatus</i>	36	GP	W. Indies, Florida Keys, C. America [widespread in S. America]
<i>H. costatus</i>	18	U	S. Mexico, Central America, Cuba
<i>H. diversifolius</i> subsp. <i>diversifolius</i>	72	CDEG _d	C. America, W. Caribbean
<i>H. furcellatus</i>	36	GP	S. Florida, Caribbean, S. Mexico
<i>H. maculatus</i>	90	CDEG _d R	Cuba [also Colombia]
<i>H. uncinellus</i>	36	GP	S. México
South America			
<i>H. acetosella</i>	36	AB	Escape from cultivation
<i>H. adscensionis</i>	36	UU	N. Bolivia
<i>H. amambayensis</i>	U	-	S. Brazil, N. Paraguay
<i>H. andersonii</i>	U	-	Mato Grosso, Brazil
<i>H. benensis</i>	U	-	C. & W. Bolivia
<i>H. bifurcatus</i>	36	GP	Widespread, N. to C. S. America
<i>H. cabralensis</i>	U	-	Minas Gerais, Brazil
<i>H. cannabinus</i>	18	A	Escape from cultivation
<i>H. capitalensis</i> ⁷	36	GP	Fed. Dist., Brazil
<i>H. chancoae</i>	U	-	E. Peru
<i>H. chapadensis</i>	U	-	Goiás, Brazil
<i>H. commixtus</i>	U	-	W. Bolivia

Taxon	Chromosome number (n)	Genome(s)	Geographic Distribution
<i>H. conceptionis</i>	U	-	C. Bolivia
<i>H. cucurbitaceus</i>	36	GP	Minas Gerais & Goiás, Brazil
<i>H. diversifolius</i>	72	CDEG _d	Ecuador (Galapagos Islands), N. Peru
subsp. <i>diversifolius</i>			
subsp. <i>rivularis</i>	72	CDEG _d	Atlantic Coast, S. Brazil
<i>H. ferreirae</i>	U	-	E. Bolivia, W. Brazil
<i>H. flagelliformis</i>	36	UU	S. Brazil, N. Paraguay
<i>H. furcellatus</i>	36	GP	Widespread, N. To C. South. America
<i>H. gregoryi</i>	U	-	Goiás, Brazil
<i>H. hasslerianus</i>	U	-	W. Brazil, E. Paraguay
<i>H. henningsianus</i>	U	-	C. Brazil
<i>H. hilarianus</i>	U	-	Minas Gerais, Brazil
<i>H. hochreutineri</i>	U	-	Mato Grosso & Tocantins, Brazil
<i>H. iterapinensis</i>	U	-	S.E. Brazil
<i>H. kitaibelifolius</i>	U	-	S. E. Brazil
<i>H. laxiflorus</i> ⁸	U	-	Goiás, Brazil
<i>H. maculatus</i>	90	CDEG _d R	Colombia
<i>H. Mariae</i>	U	-	Minas Gerais, Brazil
<i>H. matogrossensis</i>	U	-	Mato Grosso, Goiás, Brazil
<i>H. mechowii</i>	18	Y _{mec} ³	Adventive, Venezuela
<i>H. multififormis</i> ⁹	36	GP	Minas Gerais, Brazil
<i>H. nanuzae</i>	U	-	Minas Gerais, Brazil
<i>H. paludicola</i>	U	-	N.E. Bolivia, N.W. Brazil
<i>H. peruvianus</i>	36	GP	W. Amazon Basin (Bolivia, Brazil, Colombia, Ecuador, Peru, Venezuela)
<i>H. pohlii</i>	36	UU	Fed. Dist. & Goiás, Brazil
<i>H. radiatus</i>	36	AB	Escape from cultivation
<i>H. sabdariffa</i>	36	AY	Escape from cultivation
<i>H. saddii</i>	U	-	Mato Grosso, Brazil
<i>H. sebastianii</i>	U	-	Colombia
<i>H. trilineatus</i>	U	-	Tocantins, Brazil
<i>H. wilsonii</i>	36	UU	Fed. Dist., Goiás, Minas Gerais, Brazil
<i>H. windischii</i>	U	-	Mato Grosso, Brazil

¹U = Unknown genome or chromosome number

²A purple-flowered form of *H. diversifolius* occurs at Lake Euramoo, Atherton Tableland, N. Queensland, but is not referable to the *H. diversifolius* subsp. *rivularis* of Africa and Brazil.

³Provisional genome formulae (Menzel & al. 1986)

⁴As *H. meeusei* Exell (Menzel & al. 1986)

⁵As *H. heterophyllus* subsp. *luteus* (Hochr.) F. D. Wilson (Menzel & Martin 1974)

⁶As *H. spinulosus* (W. V. Fitz.) F. D. Wilson (Menzel & Martin 1974)

⁷As *H. laxiflorus* (Menzel & al. 1983a)

⁸*H. cerradoensis* Menzel, Fryxell & F. D. Wilson is a synonym of *H. laxiflorus* (Menzel & al. 1983a).

⁹As *H. kitaibelifolius* (Menzel & al. 1983a)

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