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Review

A Global Overview of Diversity and Phylogeny of the Rust Genus *Uromyces*

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Abstract: *Uromyces* is the second-largest plant pathogenic rust genus, is responsible for numerous diseases, and has major effects on both agricultural and non-agricultural plants. The genus is generally characterized by its unicellular teliospores that help to characterize it and distinguish it from another important rust genus, *Puccinia*. In this study, a global overview of the diversity and distribution of *Uromyces* is presented based on both online and offline resources. The information obtained was analyzed for numerical and graphical summaries to provide the diversity and distribution of the genus by country and continent. Besides this, broad taxonomical aspects, a brief life cycle, and other comparative aspects on diversity and distribution were also provided. In addition, a phylogenetic analysis based on the ITS and nLSU DNA sequence data available in GenBank and published literature was performed to examine the intergeneric relationships of *Uromyces*. The results obtained revealed that the rust genus is found distributed over 150 countries, territories, and occupancies of the world on around 647 plant genera belonging to 95 plant families. Phylogenetic studies based on LSU and ITS sequence data revealed that *Uromyces* species are polyphyletic and require more DNA-based analyses for a better understanding of their taxonomic placement.

Keywords: phylogeny; *Pucciniomycotina*; rust fungi; taxonomy; *Uromyces*

1. Introduction

Uromyces (Link) Unger, a genus of rust fungi, was proposed by Unger (1833). The genus contains several important plant pathogens, parasitizes in both monocots and dicots throughout the world, and affects a range of crops, causing a varying amount of yield loss annually, with losses being very severe in many cases. This genus shares synonymy with numerous genera of fungi such as *Alveomyces* Bubák., *Capitularia* Rabenh., *Coeomurus* Gray., *Dichlamys* Syd. & P. Syd., *Groveola* Syd., *Haplopyxis* Syd. & P. Syd., *Haplotelium* Syd., *Hypodermium* subgen. *Uromyces* Link., *Klebahnia* Arthur., *Nielsenia* Syd., *Poliotelium* Syd.,

Poliotelium Syd., *Pucciniola* L. Marchand., *Teleutospora* Arthur & Bisby., *Telospora* Arthur., *Trochodium* Syd. & P. Syd., and *Uromycopsis* Arthur. *Hypodermium* subgen. *Uromyces* Link 1816 has been considered the Basionym of this genus [1]. *Uromyces* is the second largest genus of rust fungus after *Puccinia* in the family *Pucciniaceae*, which contains more than 1568 epithets and more than 800 reported species [1–5]. This genus produces unicellular teliospores that help to characterize it and distinguish it from another important rust genus, *Puccinia*.

Species of *Uromyces* occur on a wide variety of plant hosts around the world. The most important ones are caused by *Uromyces* spp. that cause infections and damage to various agricultural crops such as alfalfa or lucerne rust (*Uromyces straitus* J. Schröt.), bean rust [*Uromyces appendiculatus* (Pers.) Unger], beet rust [*Uromyces betae* (Pers.) Tul.], carnation rust [*Uromyces dianthi* (Pers.) Niessl], chickpea rust (*Uromyces ciceris-aerietinus* Jacz.), clover rust (*Uromyces trofolii-repentis* Liro), and pea rust [*Uromyces pisi* (DC.) G.H. Otth.] [2]. The *Uromyces* species was recorded on the host plants belonging to the families *Asteraceae*, *Euphorbiaceae*, *Fabaceae*, *Liliaceae*, *Loranthaceae*, and *Poaceae*, and among these, *Loranthaceae* is known to be the most affected. However, the known distribution of most *Uromyces* species on *Loranthaceae* is restricted to Mexico and Central and South America [6].

The present manuscript is focused on providing a global overview of the diversity and distribution of the genus *Uromyces*. Based on the combined ITS and LSU DNA sequence data available in GenBank and published literature, phylogenetic analyses were performed to examine the intergeneric relationships of *Uromyces*. In addition, broad taxonomical aspects, a brief life cycle, and other comparative aspects of its diversity and distribution are also provided.

2. Taxonomy of the Genus *Uromyces*

The genus *Uromyces* belongs to the phylum *Basidiomycota*, the second-largest [7] phylum after *Ascomycota* in the kingdom *Fungi*; both phyla are considered higher fungi and share 97% of all fungal species [3,8–11]. Taxonomically, *Uromyces* contains rusts under the class *Pucciniomycetes* and order *Pucciniales*. Based on telial morphology, the spermogonial and aecial type, basidiospores, and uredinial characteristics, 13 rust families were proposed by Cummins and Hiratsuka [2]. However, Aime [12] and Aime and McTaggart [5] proposed several changes in basal systematics of rust fungi based on molecular studies along with morphological characteristics. This resulted in the introduction of many new families and the transmission of many genera and species. The Wijayawardene et al. [3] included 21 genera with *Uromyces* and 4961 species in the rust family *Pucciniaceae*. The recent higher-level classification for rust fungi provided recently by Aime and McTaggart [5] proposed the inclusion of 23 genera (including *Uromyces*) and 9 likely belonging to the family *Pucciniaceae*. The genus *Uromyces* was described by Unger in 1833 with *Uromyces appendiculatus* Pers. as the type species of the genus. *Uredo appendiculatus* Pers. was considered as a basionym for the type species, now regarded as *Uromyces appendiculatus* (Pers.) Link 1816. The detailed taxonomy of the genus *Uromyces* is described as follows:

Uromyces (Link) Unger, Exanth. Pflanzen (Wien): 277 (1833):

= *Alveomyces* Bubák, Annln K.K. naturh. Hofmus. Wien 28 (1–2): 190 (1914);
= *Capitularia* Rabenh., Bot. Ztg. 9 (25): 449 (1851);
= *Coeomurus* Gray, Nat. Arr. Brit. Pl. (London) 1: 541 (1821);
= *Dichlamys* Syd. & P. Syd., Annlsmycol. 17(2/6): 105 (1920), (1919);
= *Groveola* Syd., Annlsmycol. 19 (3–4): 173 (1921);
= *Haplopyxis* Syd. & P. Syd., Annlsmycol. 17 (2/6): 105 (1920), (1919);
= *Haplotelium* Syd., Annlsmycol. 20 (3/4): 124 (1922);
= *Hypodermium* subgen. *Uromyces* Link, Mag. Gesell. naturf. Freunde, Berlin 8: 28 (1816), (1815);
= *Klebahnia* Arthur, Résult. Sci. Congr. Bot. Wien 1905: 345 (1906);
= *Mapea* Pat., Bull. Soc. Mycol. Fr. 22: 46 (1906);
= *Nielsenia* Syd., Annlsmycol. 19 (3–4): 171 (1921);

= *Nigredo* (Pers.) Roussel, Fl. Calvados, Edn 2: 47 (1806);
= *Peridipes* Buriticá & J.F. Hennen, RevtaAcad. Colomb. Cienc. Exact. Fís. Nat. 19 (no. 72): 50 (1994);
= *Poliotelium* Syd., Annlsmycol. 20 (3/4): 124 (1922);
= *Puccinella* Fuckel, Jb. nassau. Ver. Naturk. 15: 18 (1860);
= *Pucciniola* L. Marchand, Bijdr. Natuurk. Wetensch. 4: 47 (1829);
= *Rubigo* (Pers.) Roussel, Fl. Calvados, Edn 2: 46 (1806);
= *Teleutospora* Arthur & Bisby, Bull. Torrey bot. Club 48: 38 (1921);
= *Telospora* Arthur, Résult. Sci. Congr. Bot. Wien 1905: 346 (1906);
= *Trichobasis* Lév., in Orbigny, Dict. Univ. Hist. Nat. 12: 785 (1849);
= *Trochodium* Syd. & P. Syd., Annlsmycol. 17(2/6): 106 (1920) (1919);
= *Uredo* Pers., Syn. meth. fung. (Göttingen) 1: 214 (1801);
= *Uromycopsis* Arthur, Résult. Sci. Congr. Bot. Wien 1905: 345 (1906).

Classification:
Pucciniaceae, *Pucciniales*, *Pucciniomycetes*, *Pucciniomycotina*, *Basidiomycota*, *Fungi*
Type of species:
Uromyces appendiculatus Pers., Observ. Mycol. (Lipsiae) 1: 17 (1796).

The characteristic one-celled teliospores of the genus *Uromyces* distinguish it from *Puccinia*, which has two-celled teliospores. *Spermogonia* subepidermal, Group V (type 4). *Aecia* subepidermal, erumpent, *Aecidium*-type (with peridium and catenuate, mostly verrucose aeciospores) or *Uredo*-type (with mostly echinulate aeciospores borne singly on pedicels). *Uredinia,* mostly the *Uredo* type, is subepidermal and erumpent and consists of echinulate urediniospores with various pores, borne singly on pedicels. Telia are subepidermal, erumpent, or remains covered by the epidermis with pedicellate, one-celled teliospores borne singly on pedicels with a mostly pigmented wall. Basidia is external in nature. The species of *Uromyces* produce macrocyclic and heteroecious modes of the life cycle, as well as many endocyclic, microcyclic, or autoecious species [2,5].

The phylogenetic analyses of different DNA loci revealed that *Uromyces,* along with the genus *Puccinia* in the family *Pucciniaceae*, is not monophyletic [5]. The generic name of *Uromyces* was recommended to be protected over *Uredo* [13]. *Uredo betae,* as one of the initially included species of this genus when described in 1801 by Persoon, is now considered a synonym of *Uromyces beticola*. Since *Uromyces appendiculatus* and *U. beticola* are regarded as congeneric, *Uromyces* and *Uredo* are synonyms. Previously, the name *Uredo* was used in cases where sexual morph was lacking and the species could not be described in the "correct" sexually typified genus. The reason why the name *Uromyces* was protected over *Uredo* is due to two major reasons: *Uredo* belongs to many different rust genera, and secondly, *Uromyces* is a commonly used generic name. The generic name *Uromyces* was already conserved over *Coeomurus* Link ex Gray 1821 and *Pucciniola* L. Marchand 1829 [13].

3. Biology, Pathogenicity, and Life Cycle of *Uromyces*

Rusts represent one of the largest groups of plant pathogens and have historically posed a major threat to farmers around the world. These diversified fungi are obligate biotrophic parasites distributed in all geographical areas on a wide range of wild and cultivated plants. The two major plant groups, cereals and legumes, suffer the most from rust infections [14]. The genus *Uromyces* consists of a number of plant pathogens responsible for many harmful plant diseases.

3.1. Disease Symptoms of Uromyces

Uromyces, as a pathogen, affects major hosts such as alfalfa (*Medicago sativa*), bean (*Phaseolus vulgaris*), carnation (*Dianthus caryophyllus*), chickpea (*Cicer arietinum*), clover (*Trifolium* sp.), and pea (*Pisum sativum*) belonging to plant families, *Fabaceae* and *Poaceae* [2,15]. The rust diseases caused by *Uromyces* spp. are characterized by numerous small, rust-like orange/yellow or brown pustules formed on infected plant tissues. *Uromyces,* as a plant pathogen, kills the diseased plant cells and forms a light yellow halo around diseased

pustules. Dark brown to black-brown telia are usually formed by the rust fungi during infection. The severity of the disease causes a loss of photosynthetic area in infected plants, resulting in a reduction in overall plant performance. Since rust disease is affected by low temperatures and heavy rain in spring and autumn, this can affect the severity of the disease. The rust diseases caused by *Uromyces* are generally autoecious (one plant host) and macrocyclic (produce five spore stages in the life cycle) in nature [2]. The appearance of rust disease symptoms varies in different hosts. A single species of *Uromyces* can infect multiple hosts and cause variable symptoms. The rust on pea (*Pisum sativum*) caused by *Uromyces pisi* and *Uromyces viciae-fabae* produce minute, whitish, slightly raised spots that enlarge and rupture the epidermis to produce reddish-brown, irregular pustules on the stems, pods and lower surface of leaves. Initially, the pustules contain abundant powdery urediniospores, but eventually, they turn dark brown to black as overwintering teliospores are produced [16]. Similarly, *Uromyces viciae-fabae* is also reported to cause lentil rust with disease symptoms of circular yellowish-white pycnidia and aecial cups on leaflets, which later become oval to circular, brown uredial pustules; and dark brown to black, elongated telia [17]. Such variability in disease symptoms caused by different *Uromyces* species can also be observed in other crops (Figure 1).

Figure 1. Disease symptoms of species of *Uromyces*. (**A**,**B**) *Uromyces ambiens* on *Buxus wallichiana*; (**C**–**E**) *Uromyces fabae* on *Pisum sativum*; (**F**,**G**) *Uromyces geranii* on *Geranium* sp.; (**H**,**I**) *Uromyces trifolii* on *Trifolium* sp. Scale bar: **A**–**I** = 1 mm.

3.2. Life Cycle

The species of rust genus *Uromyces* are generally macrocyclic in nature, i.e., exhibit all five spore forms known in *Pucciniales*. In addition, these fungi exhibit an autoecious life cycle, meaning that all spore forms are produced on a single host. However, the endocyclic or microcyclic nature with a heteroecious mode of the life cycle was observed in some species of *Uromyces* [2,5]. The general life cycle process of *Uromyces* spp. involves the germination of diploid teliospores in the spring with a metabasidium after overwintering on plant debris. The metabasidium produces four haploid basidiospores after meiosis. These basidiospores with two different mating types germinate and start infection by producing different infection structures on the surface of the host plant. Once an infection is established, the production of pycnia containing pycniospores of two mating types and receptive hyphae takes place. After, the spermatization of pycniospores of pycnia of different mating types and subsequent dikaryotization takes place in aecial primordia, along with a subsequent exchange.

After the aecium is fully developed, the mature aeciospores infect the host surface by germinating and producing infection structures. Eventually, this infection leads to the production of uredia with urediospores. With the repeated infection of the host plant, these urediospores are produced in large quantities during the summer. Surprisingly, urediospores can disseminate thousands of kilometers with the help of the wind. When suitable hosts are found, these spores differentiate into telia, which ultimately produce unicellular diploid teliospores in the winter [17,18]. A general life cycle of the rust genus *Uromyces* is presented in Figure 2 below.

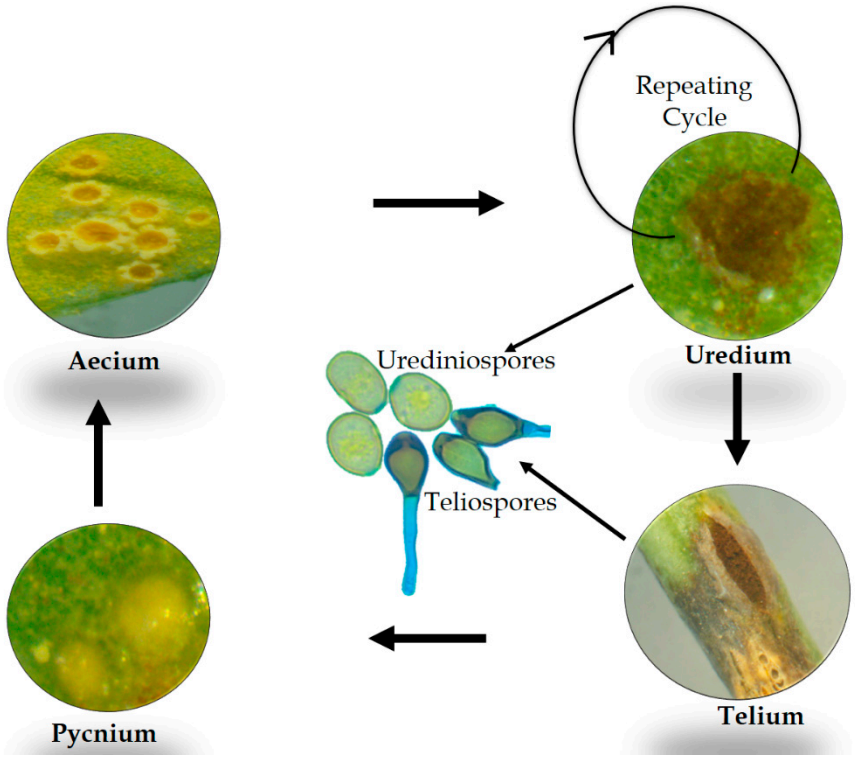

Figure 2. A general life cycle of rust genus *Uromyces*.

3.3. The Rusts as Classical Biocontrol Agents

Uromyces is the causal agent of rust disease on numerous agricultural, horticultural, and forest plantations. Rust fungi of this genus are considered a major economic threat due to possible yield losses from reduced production. Rust diseases on pea, beans, lentils, polyhouse flower crops, clover, and many more are some of the hosts infected by this genus. In addition to their identity as the causative agent of rust, the *Uromyces* species also shows potential for the biological control of various phytopathogenic fungi, weeds, etc.

The biology and effectiveness of *Uromyces heliotropii* were studied by Hasan and Aracil [19], where they found the rust to effectively control an annual weed heliotrope (*Heliotropium europaeum* L.).

They evaluated the biocontrol potential of the rust in a greenhouse and field inoculation experiments and observed that the rust rapidly killed infected plants and reduced or prevented seed production. Similarly, Anderson et al. [20] conducted a study to evaluate the potential of three rusts naturally infecting Chilean needle grass (*Nassella neesiana*) in Argentina, *Uromyces pencanus*, *Puccinia graminella*, and *P. nassellae*, as biocontrol agents. They found *U. pencanus* to be most effective due to the damage it inflicts on its host in the field. A list of species of *Uromyces* studied as biocontrol agents is given in Table 1.

Table 1. List of species of *Uromyces* with biocontrol potential.

Species of *Uromyces*	Target Organism (Plants)	Reference
Uromyces rumicis	*Rumex ckpus*	[21]
Uromyces galegae	*Galega officinalis*	[22]
Uromyces heliotropii	*Heliotropiu meuropaeum*	[19]
Uromyces pencanus	*Nassella neesiana*	[20,23–25]
Uromyces pisi-sativi	*Cytisus scoparius*	[26]
Uromyces pisi-sativi	*Chamaecytisus palmensis*	[26]
Uromyces pisi-sativi	*Lupinus polyphyllus*	[26]

Rust fungi as biocontrol agents are mainly studied in their use against plant weeds. The biocontrol ability of some species of *Puccinia* was investigated, such as as *P. abrupta* var. *partheniicola* on different growth stages of *Parthenium hysterophorus* [27,28], *Puccinia arechavaletae* on *Cardiospermum grandiflorum* [29], *Puccinia komarovii* var. *glanduliferae* on *Impatiens glandulifera* [30], and *Prospodium transformans* on *Tecoma stans* var. *stans* [31]. A number of studies on *Uromyces* species have been carried out by a number of researchers (see Table 1), but the assessment of species from other rust genera has not yet been well established. Furthermore, the broad aspects of the rust fungi as biocontrol agents based on biochemical and molecular approaches still need to be explored.

4. Data Collection and Molecular Analysis

4.1. Data Collection and Compilation

This paper was compiled based on the information obtained from an extensive search of peer-reviewed publications, field guides, monographs, books, conference proceedings, project reports, and other offline and online resources. This information was updated as recently as December 2020. The information obtained was compiled firstly as a table depicting names of species of *Uromyces*, their hosts along with the family, the locality of occurrence, and the reference of scientific publication. The scientific names of the hosts and fungi were then cross-verified for scientific entities. The host name given in the original citation was sometimes changed to be consistent with the current taxonomy based on The Plant List (http://www.theplantlist.org; accessed on 20 April 2022). The names of rust fungi genus/species as reported in the cited publications were replaced by currently accepted names according to the websites MycoBank (www.mycobank.org; accessed on 20 April 2022) and Species Fungorum (www.speciesfungorum.org; accessed on 20 April 2022). Fungal Databases, US National Fungus Collections, ARS, USDA, an important online source of plant pathogens and their hosts, was also noted during the compilation [32]. An attempt was made to summarize all available literature on diversity and distribution of *Uromyces* spp.; only the most appropriate references were included in this study.

4.2. Analyses of Collected Data

After inserting the collected data into the primary database as a table, they were analyzed for numerical and graphical summaries. First, the information was analyzed by providing a comparative representation of the diversity and distribution of rust fungi

(*Uromyces*) by country and continent. Thereafter, distribution patterns based on substrate types (herb, shrub, and tree) were constructed to understand the host preference of these rust fungi. In addition, the data of the host family were also presented. The publication indices of *Uromyces* spp. in terms of year, decade, and era are analyzed and presented in this paper. In addition, the references in other languages are translated into English so that the scientific community can understand them easily.

4.3. Molecular Data Analyzing

DNA sequence data of *Uromyces* species from the LSU and ITS rDNA were downloaded from GenBank and through earlier published literature. A checklist of molecular studies on *Uromyces* sp. along with the name of isolate and references were also prepared and presented in Table 2. The relevant publications on molecular analyses were also consulted [5,12,33,34]. Individual nucleotide sequences of LSU and ITS were aligned distinctly using MAFFT 7 (http://mafft.cbrc.jp/alignment/server/; accessed on 1 April 2022) [35], followed by manual checking and editing where necessary in BioEdit v. 7.0.9 [36]. The sequences of taxa containing poorly aligned portions, incomplete data, missing sequence data, and gaps were trimmed. The ITS and LSU sequences alignment was converted to NEXUS format (.nxs) using ClustalX 2.1 (http://www.clustal.org/clustal2/; accessed on 1 April 2022) for Phylogenetic Analysis Using PAUP (PAUP) analysis. The aligned LSU and ITS single-gene datasets and a concatenated dataset of LSU and ITS genes were analyzed with PAUP 4.0b10 [37]. These datasets were run after completing the program output tree in the Bootstrap.tre file. Maximum Likelihood bootstrap values greater than 60% are considered good bootstrap supports and are given above each node. Phylogenetic trees are visualized using the FigTree v1.4.0 program [38] and reorganized in Microsoft power point.

Table 2. GenBank and voucher/culture collection accession numbers of *Uromyces* species included in the phylogenetic study.

Taxa	Isolate Name	GenBank Accession No.		References
		ITS	LSU	
Uromyces acetosae	DAOM 159824	HQ317557	HQ317557	[39]
Uromyces acuminatus	DUCC506	-	KC570451	[40]
	CT-V080623-3	GU109282	-	[41]
Uromyces aemulus	HSZ0345	AF511081	AF511081	[42]
Uromyces aloes	2020-6-28-0005	MT136509	-	Unpublished
	WM 3290	-	DQ917740	[43]
Uromyces alopecuri	DAOM 234714	HM131363	HM131363	[44]
Uromyces alyxiae	BPI 871816	-	KY764186	Unpublished
Uromyces anthyllidis	EB19	FJ468411	-	[45]
Uromyces ari-triphylli	BPI 871111	DQ354529	DQ354528	[12]
Uromyces betae	BPI910289	KY764187	-	Unpublished
Uromyces beticola	PDD:101534	KX985757	KX985757	[46]
Uromyces bidenticola	ZP-R1366	-	MK518671	Unpublished
Uromyces caricis-sempervirentis	GZU 10-94	-	DQ917714	Unpublished
Uromyces chenopodii-fruticosi	K(M)107793	-	MT053261	[47]
Uromyces ciceris-arietini	BPI 879192	FJ468398	GU058030	[48]
	-	GQ914998	-	[49]
Uromyces clignyi	DAOM 192217	HM131364	-	[44]

Table 2. *Cont.*

Taxa	Isolate Name	GenBank Accession No.		References
		ITS	LSU	
Uromyces coloradensis	DAOM 181557	HQ317565	-	[39]
	DAOM187619	HQ317564	-	[39]
Uromyces coronatus	DAOM 32991	HM131365	-	[44]
	BPI 910293	-	KY764191	Unpublished
Uromyces dactylidis	PRC692	KM667950	-	[50]
	TUB 14997	-	DQ917745	[43]
Uromyces dianthi	BPI 141961	-	KY764192	Unpublished
Uromyces dolicholi	DAOM 116149	HQ317563	-	[39]
Uromyces durus	IBAR11149	LC203758	-	[51]
Uromyces eragrostidis	BPI004474	-	KY575113	Unpublished
Uromyces erythronii	DE-soo-43285	MH205917	MH205917	[52]
Uromyces euphorbiae	F425	AF180158	-	[53]
	BPI 863673	-	KT750330	Unpublished
Uromyces ficariae	WM 1398	-	AF426204	[33]
Uromyces gageae	HMJAU:8558	MG742207	MG742207	[54]
	U242	DQ250133	DQ250133	[55]
Uromyces geranii	BRIP 60100	-	KX999898	[56]
Uromyces gladioli	-	-	GU936633	[57]
Uromyces graminicola	URO 3	KR264705	-	[58]
Uromyces halstedii	U1673	MG905913	-	[59]
Uromyces hawksworthii	UB:22382	KR821137	-	[60]
	UB:22875	KR821138	-	
	UB:22875	-	NG059990	
Uromyces hedysari-obscuri	DAOM 189699	HQ317573	-	[39]
	DAOM 223015	-	HQ317572	
Uromyces ixiae	RSA191	-	DQ917738	[43]
	RSA8	-	DQ917739	Unpublished
Uromyces japonicus	TNS:F:61987	LC203759	LC203759	[51]
Uromyces jonesii	DAOM 137431	HQ317559	HQ317559	Unpublished
Uromyces junci	GZU 11-98	-	AF426203	[33]
Uromyces klotzschianus	BA91	MF044015	-	[61]
	BA92	MF044016	-	
	BA93	-	MF044017	
Uromyces lespedezae-procumbentis	BPI 910294	KY764193	-	Unpublished
Uromyces lomandracearum	BRIP:59022	-	KM249862	[62]
Uromyces lupini	DAOM 233961	HQ317570	HQ317570	[39]
Uromyces magnusii	PDD:94487	KX985755	-	[46]
Uromyces minor	MVAP50000151	MK045314	-	Unpublished
Uromyces musae	DAOM 192221	HQ317556	-	[39]

Table 2. *Cont.*

Taxa	Isolate Name	GenBank Accession No.		References
		ITS	LSU	
Uromyces muscari	DAOM 75626	HQ317552	HQ317552	[39]
Uromyces neotropicalis	MCA2533	-	DQ021885	[63]
Uromyces novissimus	R20	-	EU851147	[57]
Uromyces orientalis	BRIP 60934	KX999899	-	[56]
Uromyces otaviensis	NA 305	-	DQ917715	[43]
Uromyces peglerae	BPI 843311	-	KY575116	Unpublished
Uromyces pisi-sativa	-	DQ521591	-	Unpublished
	BRIP 60151	-	KX999900	[56]
Uromyces plumbarius	070P06138145	KP313731	-	[64]
	RK44	-	JQ312671	[65]
Uromyces polygoni-avicularis	DAOM 181565	-	HQ317558	[39]
Uromyces probus	BPI 893209	KT267172	-	[66]
Uromyces rebeccae	FDWSRU 15-022	MN386999	MN386999	[47]
Uromyces reichertii	6421	AF511084	AF511084	[42]
Uromyces rumicis	PDD:93529	KX985763	-	[46]
	BPI 910298	-	KY764197	Unpublished
Uromyces salsolae	FDWSRU 05-090	MN381162	MN381162	[47]
Uromyces scaevolae	BRIP:57517	KF690686	KF690686	[67]
Uromyces scutellatus	E328	AF180200	AF180200	[53]
Uromyces setariae-italicae	BPI 863744	KY575068	-	Unpublished
Uromyces setariae-italicae	BPI 863750	-	KY575069	Unpublished
Uromyces socius	BPI 910302	-	KY764200	Unpublished
Uromyces sporobolicola	DAOM 114294	HQ317560	HQ317560	[39]
Uromyces striatus	U-675	HQ412651	-	[68]
	DAOM 240966	HQ317512	-	[39]
Uromyces striolatus	E405	AF180201	AF180201	[53]
Uromyces strobilanthis	BPI 893253	-	KY798375	Unpublished
Uromyces tenuicutis	BRIP 60012	-	KX999904	[56]
Uromyces transversalis	NZ11 PDD-99990	JQ777025	-	Unpublished
	CA1124	JQ776984	-	Unpublished
	PUR:N16743	-	MF374730	[69]
Uromyces trifolii	-	-	GU936634	[57]
Uromyces trifolii-repentis	R217	EU014070	-	[70]
	BRIP 57653	-	KX999905	[56]
Uromyces viciae-fabae	TSH_R6320	AB115665	-	[71]
	WM 1365	-	AF426199	[33]
Uromyces vignae	H92019	AB115731	-	[72]
	H50721	AB115726	-	
	BRIP 60213	-	KX999906	[56]
	BRIP 60213	-	KX999906	
Uromyces wedeliae	BRIP 60000	-	KX999907	[56]

5. Distribution, Diversity, and Molecular Data Analysis of *Uromyces*

5.1. Phylogenetic Analyses

In the phylogenetic results, *Uromyces* were separated into two complexes in both ITS and LSU sequence data. Both complexes of ITS and LSU share many similar sequences. The incomplete sequences were mostly found in the *Uromyces* sequence dataset, e.g., ITS1 and 5.8S or ITS1, 5.8S complete, and ITS partial or 28S partially. Approximately 50% of the sequences had up to 300 nucleotides, while the remaining sequences had up to 800 nucleotides. Incomplete sequences can result in two complexes in a single genus. Therefore, complete gene sequences from ITS and LSU are needed to analyze these complex clades (Figures 3 and 4).

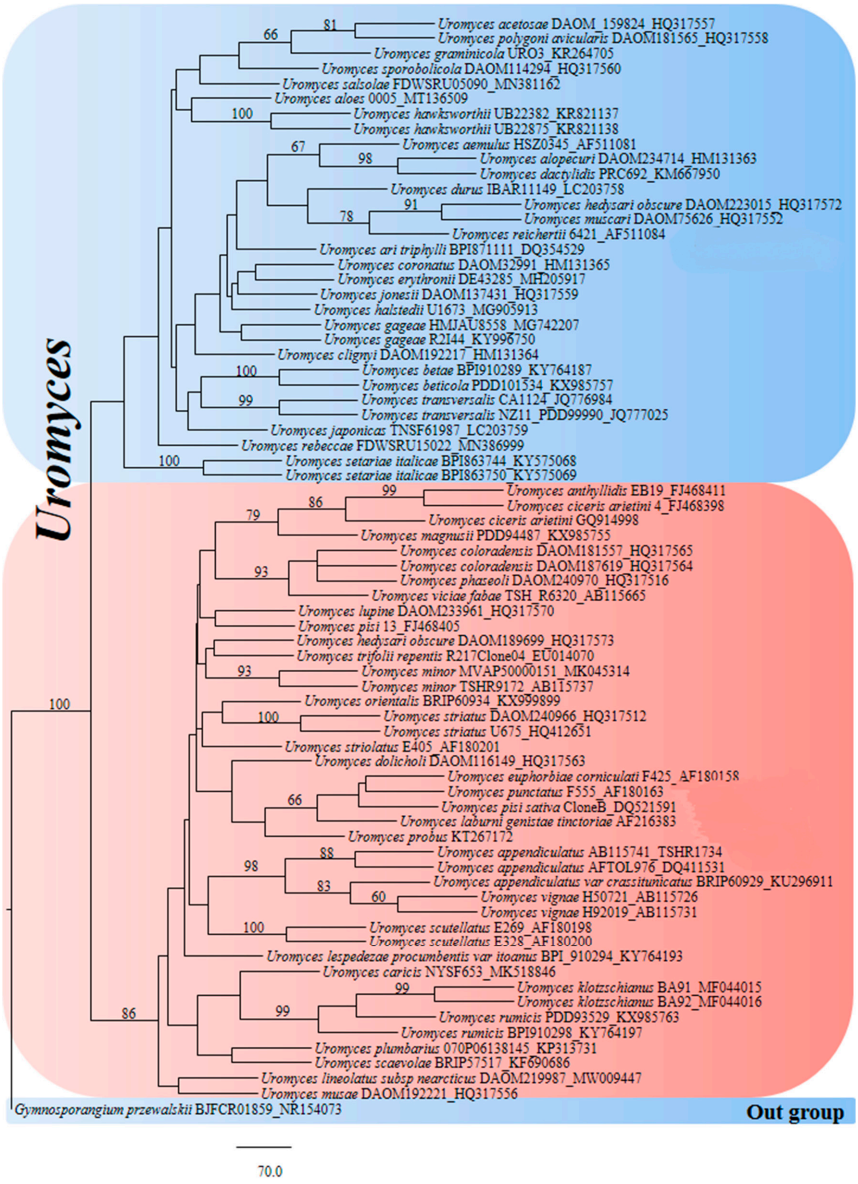

Figure 3. Phylogram generated from PAUP analysis of *Uromyces* species of ITS sequences. The scale bar indicates 70 changes and outgroup *Gymnosporangium przewalskii* BJFCR01859_NR154073. Bootstrap values of MP > 60% are given above branches, and 72 sequences are included in the phylogenetic analyses. The best maximum parsimony (MP) dataset consists of 394 total characters, of which 164 were constant, 156 parsimony-informative, and 74 parsimony-non-informative. The parsimony analysis of the data matrix showed a thousand equally parsimonious trees with a length of 917 steps in the first tree (CI = 0.408, RI = 0.702, RC = 0.286, HI = 0.592).

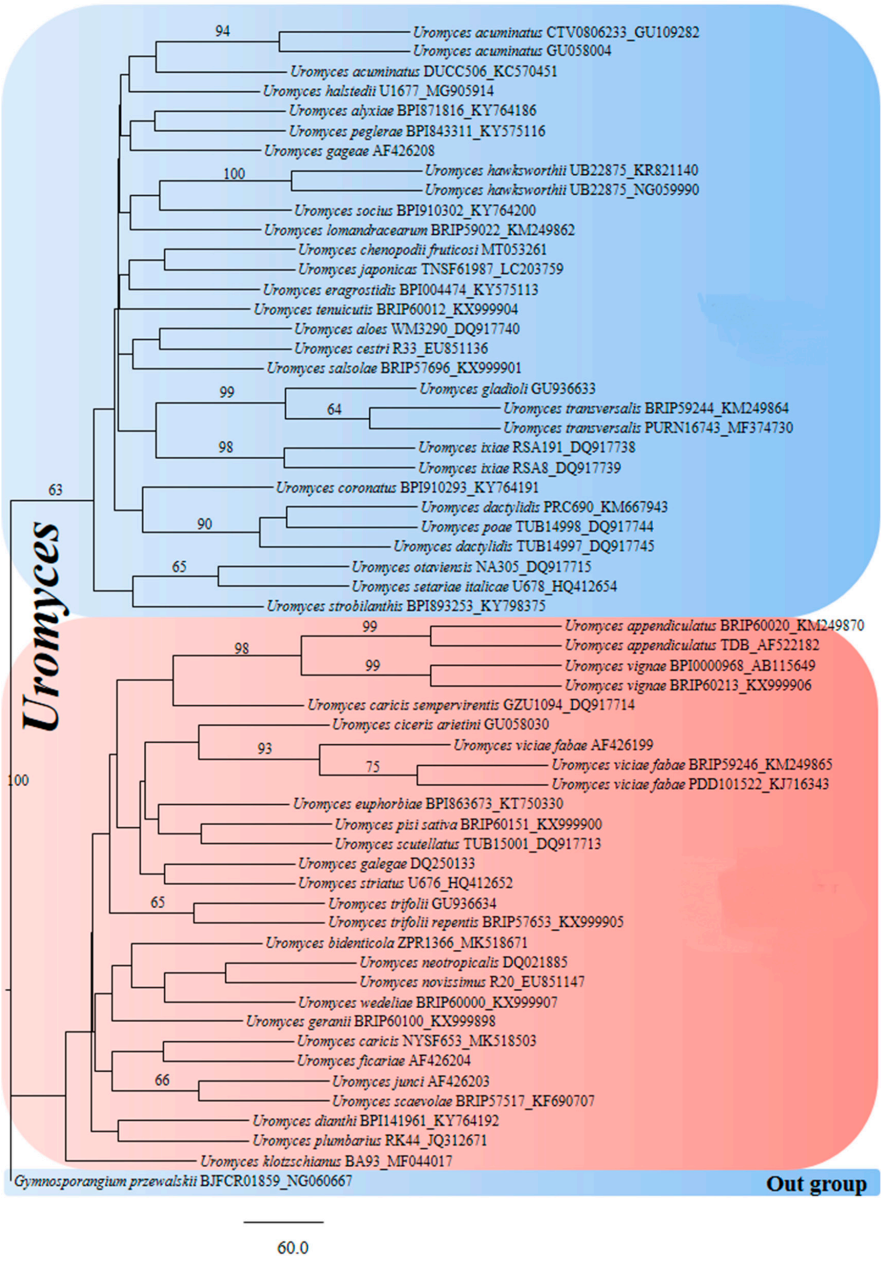

Figure 4. Phylogram generated from PAUP analysis of *Uromyces* species of LSU sequences. The scale bars indicate 60 changes and outgroup *Gymnosporangium przewalskii* BJFCR01859_NG060667. Bootstrap values of MP equal to or greater than 60% are given above branches, and 58 sequences are included in the phylogenetic analyses. The best maximum parsimony (MP) dataset consists of 873 total characters, of which 600 were constant, 125 parsimony-informative, and 148 parsimony-non-informative. The parsimony analysis of the data matrix showed 1000 equally parsimonious trees with a length of 625 steps in the first tree (CI = 0.550, RI = 0.708, RC = 0.389, HI = 0.450).

5.2. Morphological Diversity and Distribution

The results compiled on diversity and distribution revealed that the rust genus *Uromyces* comprised a total of 1500 species that occurred worldwide as obligate parasitic fungi on vascular plants [3,4]. After combing through the different online databases [1,32,73], a total of 988 species were included in this paper. Similar to all fungi, its distribution shows great variations in different parts of the world. The tremendously changing climates across the world lead to diversified flora, resulting in a wide diversity and distribution of rust fungi. With regard to global diversity, it is pertinent to note here that *Uromyces* varies in diversity

among countries and continents. These rust fungi generally show a macrocyclic nature and autoecious mode of the life cycle [2,5], which confirms their morphological diversity on specific hosts in particular regions. The broad host range in microcyclic and heteroecious life cycles was also found in *Uromyces* species.

The genus *Uromyces* predominantly showed its great diversity in North America in comparison to other continents. Almost 834 (30%) species are described here, which is the highest among all continents. The diversity of the genus is known in other continents of the world as follows: Asia, with 633 (23%) species described; Europe, with 622 (23%) species; North America, with 321 (12%) species; Africa, with 313 (11%) described species; and Australia, with 32 (1%) species described. The genus appears to be well-represented in North American, Asian, and European counties. After dispersal by various modes, such as wind, water, or insect vectors, the propagules of rust fungi germinate and infect plant tissues of specific hosts. Entry of these pathogens takes place either by natural openings such as lenticels and stomata or by wounds or injuries caused by various physical agents [74].

Human anthropogenic activities also play an important role in the global distribution of these organisms. So far, *Uromyces* species have been found on every land on earth except Antarctica. To understand the distribution of the *Uromyces* species, we analyzed their distributions across continents and terrestrial ecoregions. More than 150 countries and territories or occupancies showed the distribution of this rust genus. Although only 73 sequences of ITS and nLSU *Uromyces* species were identified based on molecular characteristics, respectively, the majority of the species are still identified morphologically. This may impact the number and distribution pattern of the *Uromyces* species as molecular-based research on the rust fungi progress. In comparison to all continents, the highest distribution of 834 species of *Uromyces* was recorded over 66 regions of different countries and dependencies of North America. The distribution pattern observed in other continents was observed as follows: 633 species in 26 countries and dependencies of Asia; 622 species in 33 countries and dependencies of Europe; 321 species in 17 countries and dependencies of South America; 313 species in 27 countries and dependencies of Africa; and 37 species in 3 countries, islands, or dependencies of Oceania. The array of this global distribution of *Uromyces* species reveals their vast diversity and justifies its position as the second-largest genus of rust fungi (Figures 5 and 6).

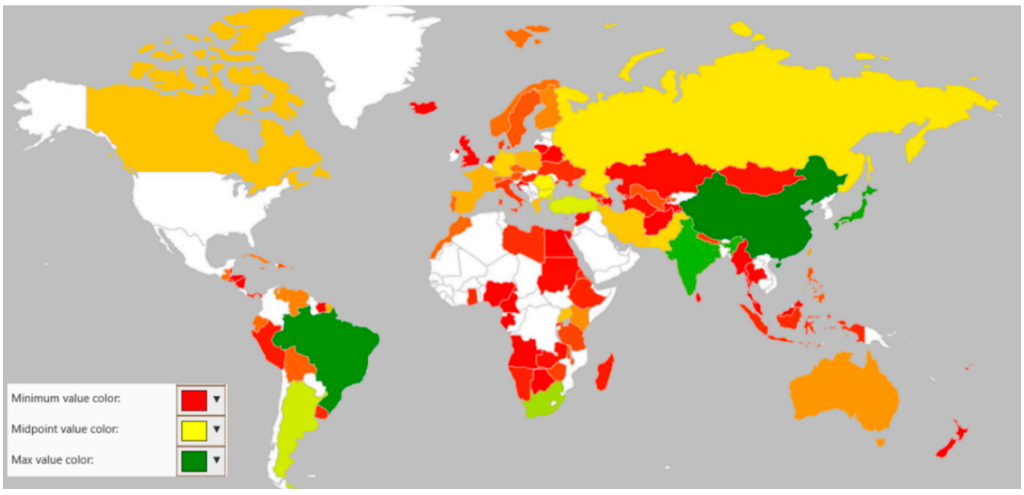

Figure 5. Heat map to show the global distribution and species richness of *Uromyces* spp.

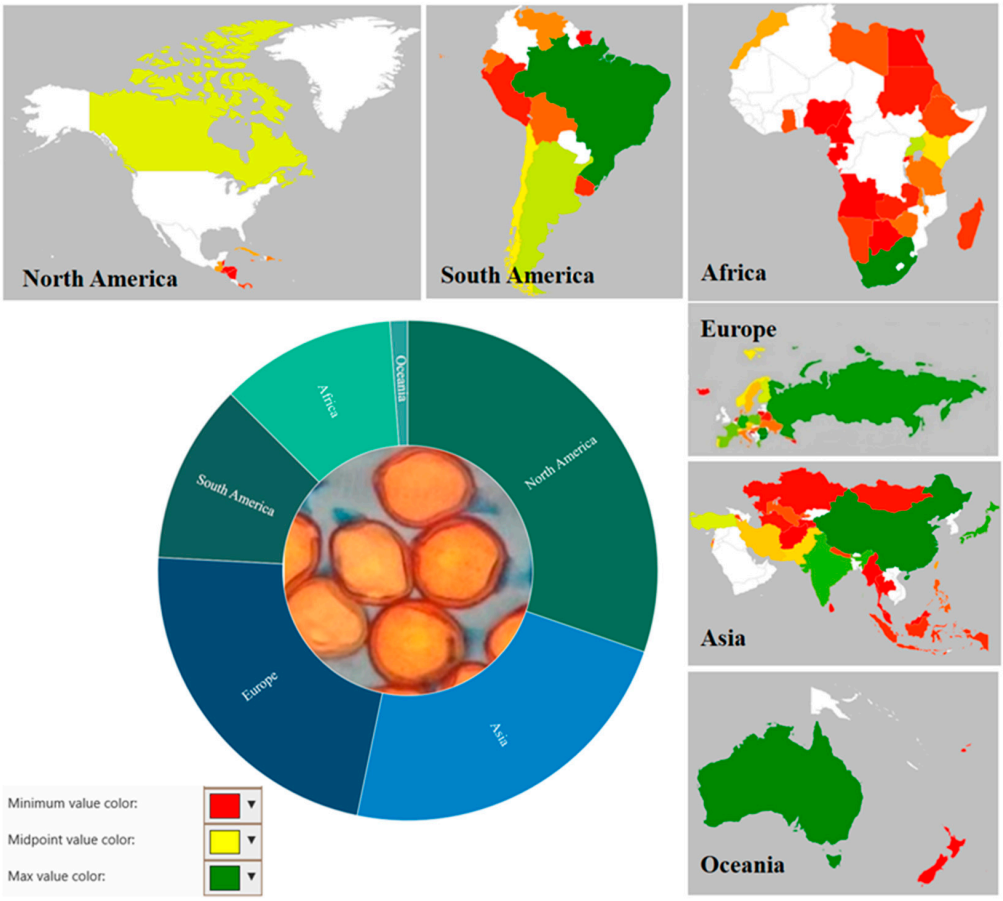

Figure 6. Heat maps to show the continental distribution and species richness of *Uromyces* spp.

Distribution: America, Kazakhstan, India, Brazil, Syria, México, Russia, Cyprus, Ecuador, Uzbekistan, New Guinea, Cape Province, Algeria, Tunisia, Japan, Norway, China, Uganda, Hawaii, Argentina, Canada, Siberia, France, South Africa, Sri Lanka, Ethiopia, Colombia, Romania, Costa Rica, Israel, Chile, Switzerland, Ivory Coast, Uganda, Turkey, Kenya, Morocco, Britain, New Zealand, Malaysia, Philippines, Iran, Greece, Madagascar, Romania, Australia, Yunnan, Tadzhikistan, Pakistan, Zimbabwe, Myanmar, Namibia, Costa Rica, Taiwan, Nepal, Italy, Cuba, Afghanistan, Egypt, Iraq, Peru, Tibet, Croatia, Sudan, Ecuador, Jamaica, Sweden, Bolivia, Spain, Austria, Tunisia, Kenya, Norway, Kansas, Peru, Poland, and Venezuela.

5.3. Distribution Patterns of Rust Fungi (Uromyces) by Substrate Types

Uromyces, being the second-largest rust genus after *Puccinia*, contains a number of important plant pathogens. The species of *Uromyces* attacks nearly all categories of plants and causes great damage to both plant and their products. *Uromyces* is a genus of rust fungi that infects both monocots and dicots throughout the world. Analyses of the available literature on host diversity of *Uromyces* revealed that a total of 647 plant genera belonging to 95 plant families were found to be infected by these rust fungi. *Uromyces* is particularly reported in plant families such as *Amaranthaceae*, *Apiaceae*, *Asparagaceae*, *Asteraceae*, *Caryophyllaceae*, *Cucurbitaceae*, *Cyperaceae*, *Euphorbiaceae*, *Fabaceae*, *Iridaceae*, *Poaceae*, and *Rubiaceae*. The highest occurrences of *Uromyces* spp. were observed in *Poaceae* and *Fabaceae*, with 105 and 103 infected host genera, respectively. A number of other families that have an infection in up to 50 plant genera have also been observed, including *Acanthaceae*, *Asparagaceae*, *Asteraceae*, *Caprifoliaceae*, *Cyperaceae*, *Euphorbiaceae*, *Fabaceae*, *Lamiaceae*, *Liliaceae*, *Loranthaceae*, *Oleaceae*, *Poaceae*, and *Polygonaceae*. A study on the diversity and distribution of *Uromyces* in India by Gautam and Avasthi [75] revealed that nearly 180 plant species belonging to

85 genera and 32 families were found to be infected with *Uromyces* spp. Among all families, *Fabaceae* and *Poaceae* were found to be the most infected with different species of *Uromyces*. A family-wise comparison of the genera of infected host plants is shown in Figure 7.

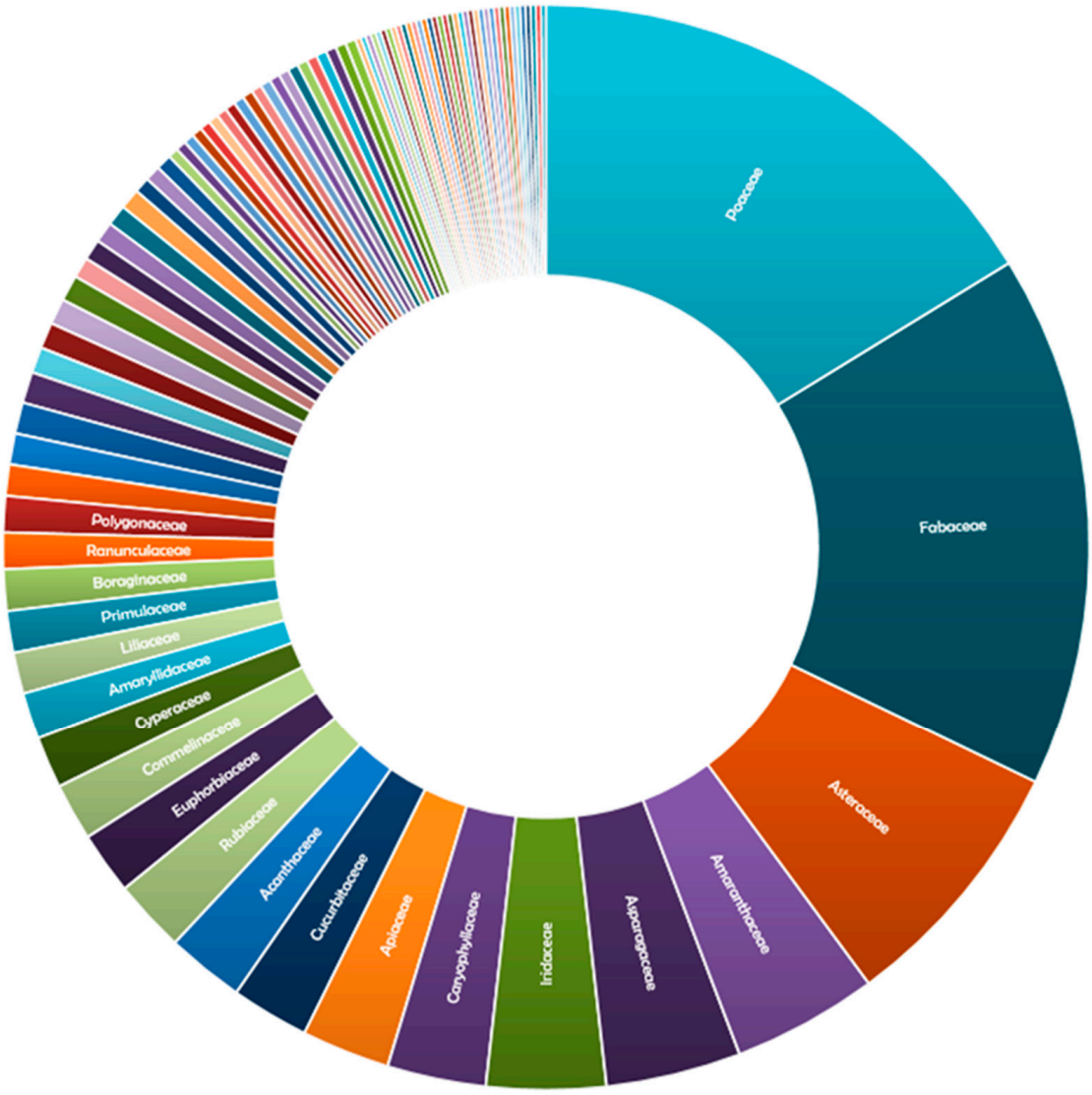

Figure 7. Family-wise comparison of genera of infected host plants.

5.4. Global Host Range of Uromyces Species

The host range of *Uromyces* species showed their occurrence in 647 plant genera of 95 plant families. They are reported to be infected by various species of *Uromyces,* such as: *Abrus*, *Abuilon*, *Acacia*, *Acalypha*, *Acantholimon*, *Acanthophyllum*, *Acetosa*, *Achyranthes*, *Acidanthera*, *Acorus*, *Aconitum*, *Actinostemon*, *Adenostyles*, *Aegopogon*, *Aellenia*, *Aeluropus*, *Agropyron*, *Agrostis*, *Aira*, *Albizia*, *Albuca*, *Alhagi*, *Allium*, *Aloe*, *Alopecurus*, *Alstroemeria*, *Alysicarpus*, *Alyxia*, *Amblytropis*, *Ambrosia*, *Amischotolype*, *Amphicarpaea*, *Amphilophis*, *Anabasis*, *Anaphalis*, *Anarthrophyllum*, *Ancrumia*, *Andropogon*, *Aneilema*, *Anemone*, *Anguria*, *Anguria*, *Anisotome*, *Anomatheca*, *Anotis*, *Anthacanthus*, *Anthericum*, *Antholyza*, *Aphelandra*, *Apios*, *Apluda*, *Ardisia*, *Arenaria*, *Argyrolobium*, *Arisaema*, *Aristida*, *Armeria*, *Arnica*, *Artemisia*, *Arthrocnemum*, *Asclepias*, *Ascyrum*, *Aspalathus*, *Asperula*, *Aspilia*, *Aster*, *Astragalus*, *Astrebla*, *Atriplex*, *Atylosia*, *Avenella*, *Avenula*, *Babiana*, *Baccharis*, *Bahia*, *Baltimora*, *Bartholina*, *Basella*, *Bauhinia*, *Beckeropsis*, *Beckmannia*, *Bellevalia*, *Beloperone*, *Benedictella*, *Beta*, *Bidens*, *Blainvillea*, *Boissiera*, *Bolboschoenus*, *Boltonia*, *Bomarea*, *Bonaveria*, *Bongardia*, *Borreria*, *Bothriochloa*, *Bouvardia*, *Brachiaria*, *Bradburya*, *Briza*, *Brodiaea*, *Bromus*, *Bryzopyrum*, *Bufonia*, *Buforrestia*, *Bulbine*, *Bupleurum*, *Buxus*, *Cacalia*,

Caccinia, Cachrys, Cajanus, Calamagrostis, Calandrinia, Callicarpa, Callisia, Calopogonium, Caltha, Calycotome, Calyptridium, Camptosema, Campylotropis, Canavalia, Capillipedium, Caragana, Carex, Cassia, Caucalis, Cayaponia, Celosia, Celtis, Centropogon, Centrosema, Cerastium, Ceratocarpus, Ceratoides, Cestrum, Chaetobromus, Chaetochloa, Chaetolimon, Chamaecrista, Chamaecytisus, Chamaesyce, Chasmanthe, Chenopodium, Chesneya, Chiloglottis, Chionodoxa, Chloris, Chlorophytum, Chorizanthe, Cicer, Cicuta, Cimacoptera, Cirsium, Cissus, Cladostachys, Cladrastis, Claytonia, Cleome, Climacoptera, Clitoria, Clutia, Cnidoscolus, Cnidoscolus, Colchicum, Collomia, Cologania, Colutea, Combretum, Commelina, Commiphora, Convolvulus, Corallocarpus, Cordia, Coronilla, Cosmos, Crepis, Crocosmia, Crocus, Crotalaria, Cruckshanksia, Cucubalus, Cucumis, Cucurbita, Curculigo, Cyanotis, Cyathula, Cymbopogon, Cynosurus, Cyperus, Cypholepis, Cytisus, Dactylis, Dactyloctenium, Dalbergia, Danthonia, Deeringia, Dendroseris, Deschampsia, Desmodium, Desmostachya, Dianthus, Dichanthium, Dichromena, Dicliptera, Dierama, Digitaria, Diodia, Dipcadi, Dipogon, Discaria, Distichlis, Dodecatheon, Dolicholus, Dolichos, Doronicum, Dorycnium, Dorycnopsis, Dorystaechas, Doyerea, Dracaena, Drimiopsis, Echinocephalum, Edwardsia, Ehretia, Ehrharta, Eleocharis, Emex, Emmeorhiza, Enargea, Endymion, Engysiphon, Epicampes, Eragrostis, Eremopogon, Eremopyrum, Eriochloa, Eriogonum, Eriophyllum, Eriosema, Eriospermum, Erodium, Ervum, Erythrina, Erythronium, Eulophia, Euphorbia, Euryops, Excoecaria, Exotheca, Fatoua, Ferraria, Ferula, Festuca, Ficaria, Fimbristylis, Flemmingia, Fleurya, Floscopa, Freesia, Fritillaria, Gagea, Galactia, Galega, Galinsoga, Galium, Galphimia, Gamanthus, Gaudichaudia, Gaura, Gayophytum, Geissorhiza, Genista, Gentiana, Geranium, Gilliesia, Gladiolus, Glaux, Glyceria, Glycyrrhiza, Gnaphalium, Gomphrena, Gossypium, Gouania, Grindelia, Guizotia, Gurania, Gypsophila, Habrochloa, Haemanthus, Halenia, Halimodendron, Halocharis, Haloxylon, Hardenbergia, Hedysarum, Helianthus, Helichrysum, Helictotrichon, Heliopsis, Heliotropium, Helleborus, Helmontia, Hemarthria, Heracleum, Hesperantha, Heteranthera, Heteromorpha, Heteropogon, Hewittia, Hibiscus, Hippocrepis, Hippomarathrum, Holcus, Homogyne, Honckenya, Hookera, Hordeum, Hosackia, Houstonia, Hyacinthoides, Hyacinthus, Hydrocotyle, Hymenocarpos, Hyparrhenia, Hypericum, Hypoestes, Hypoxis, Hypsela, Indigofera, Inga, Ipomoea, Iresine, Isathne, Ixia, Jacobinia, Jacquemontia, Jasminum, Jatropha, Jaumea, Juncus, Juniperus, Justica, Kalidium, Karroochloa, Kochia, Koeleria, Krameria, Kraschenninnikovia, Kummerowia, Kyllinga, Lablab, Laburnum, Lachenalia, Lantana, Lapeirousia, Lasiacis, Lasiocorys, Lathyrus, Ledenbergia, Leersia, Lembotropis, Lens, Leonotis, Leontice, Leopoldia, Leptochloa, Lerchenfeldia, Lespedeza, Leucocoryne, Ligularia, Lilium, Limonium, Lloydia, Loeselia, Lomandra, Loranthus, Lotononis, Lotus, Lupinus, Luzula, Lychnis, Lygeum, Lysimachia, Maackia, Maianthemum, Mallotus, Manettia, Manihot, Massonia, Mattiastrum, Medicago, Meibomia, Melandrium, Melanolepis, Melanthera, Melasphaerula, Medica, Melilotus, Melothria, Menyanthes, Mercurialis, Merremia, Messerschmidia, Microchloa, Microlespedeza, Microtis, Miersia, Mikania, Milium, Milla, Mimusops, Minuartia, Modecca, Moehringia, Momordica, Monocymbium, Montanoa, Moraea, Mucuna, Muehlenbeckia, Muhlenbergia, Mulinum, Muricauda, Musa, Muscari, Myosotis, Myrsine, Nassauvia, Nassella, Noaea, Nothoscordum, Nymphoides, Ocimum, Odontonema, Oenanthe, Oenothera, Olsynium, Onagra, Onobrychis, Ononis, Ophiorrhiza, Oreopolus, Ormosia, Ornithogalum, Ornithopus, Orobus, Orthosiphon, Oryctanthus, Oryza, Oxytropis, Pachylophus, Panicum, Parietaria, Paspalum, Paspalum, Passiflora, Pavonia, Peireskia, Peltandra, Pennisetum, Pentace, Pentaschistis, Peplis, Peracarpa, Perymenium, Petrorhagia, Petrosimonia, Peucedanum, Phaca, Phacelurus, Phalaris, Phaseolus, Phleum, Phlogacanthus, Phlox, Phoradendron, Phragmites, Phrygilanthus, Phthirusa, Physanthyllis, Phyteuma, Piptanthus, Pisum, Pittosporum, Plantago, Poa, Poinsettia, Poiretia, Poitea, Polemannia, Polemonium, Pollia, Polycnemum, Polygala, Polygonum, Polymnia, Polytrias, Polyxena, Pontederia, Pozoa, Prangos, Pratia, Primula, Priva, Pseudarthria, Pseuderanthemum, Psoralea, Psychotria, Pteracanthus, Pulicaria, Quinchamalium, Ranunculus, Rapanea, Rapanea, Ratibida, Rhinacanthus, Rhinopetalum, Rhynchospora, Rhynchosia, Ribes, Roepera, Romulea, Rosa, Rottboellia, Rudbeckia, Ruellia, Rumex, Rytidosperma, Sabinea, Salicornia, Salmea, Salpichroa Salsola, Sapium, Saururus, Scaevola, Schismus, Schizachyrium, Schizeilema, Scilla, Scirpus, Scleranthus, Scleria, Sclerochloa, Scribneria, Secale, Secamone, Securigera, Sedum, Selliera, Selysia, Senecio, Sesbania, Seseli, Sessea, Setaria, Sigesbeckia, Silene, Silphium, Simethis, Siphocampylus, Siphocampylus, Sisyrinchium, Sium, Smilacina, Smilax, Snowdenia, Solanum, Solaria,

Solidago, *Sophora*, *Sorghum*, *Sparaxis*, *Sparganium*, *Spartina*, *Spergularia*, *Spermacoce*, *Sphaeralcea*, *Sphenostylis*, *Sporobolus*, *Spraguea*, *Stellaria*, *Stenorrhynchus*, *Stipa*, *Strobilanthes*, *Strumaria*, *Struthanthus*, *Stylochaeton*, *Suaeda*, *Swainsona*, *Teramnus*, *Tessaria*, *Tetraena*, *Tetragonolobus*, *Thalictrum*, *Thapsia*, *Thelymitra*, *Themeda*, *Thermopsis*, *Thyrsacanthus*, *Tithymalus*, *Tournefortia*, *Toona*, *Tradescantia*, *Tragus*, *Triadenum*, *Trianosperma*, *Tribolium*, *Trichocline*, *Tricholaena*, *Trichoneura*, *Trichosanthes*, *Tricoryne*, *Trifolium*, *Trigonella*, *Tripogandra*, *Tripogon*, *Tripsacum*, *Trisetum*, *Triteleia*, *Tritonia*, *Trochomeriopsis Tulipa*, *Tylosema*, *Ulex*, *Uraria*, *Urginea*, *Urochloa*, *Valerianella*, *Veratrum*, *Verbascum*, *Veronica*, *Vicia*, *Vigna*, *Vilfa*, *Viola*, *Viscaria*, *Viscum*, *Vitis*, *Vossia*, *Vulpia*, *Watsonia*, *Wedelia*, *Wilbrandia*, *Wulffia*, *Zantedeschia*, *Zebrina*, *Zexmenia*, *Zigadenus*, *Zizania*, *Zizaniopsis,* and *Zygophyllum*. This compiled information depicts the broad host range of these rust fungi. The association of *Uromyces* species with some host plants is given in Figure 8, while detailed information on the diversity, host range, and distribution of *Uromyces* species is summarized in Table 3.

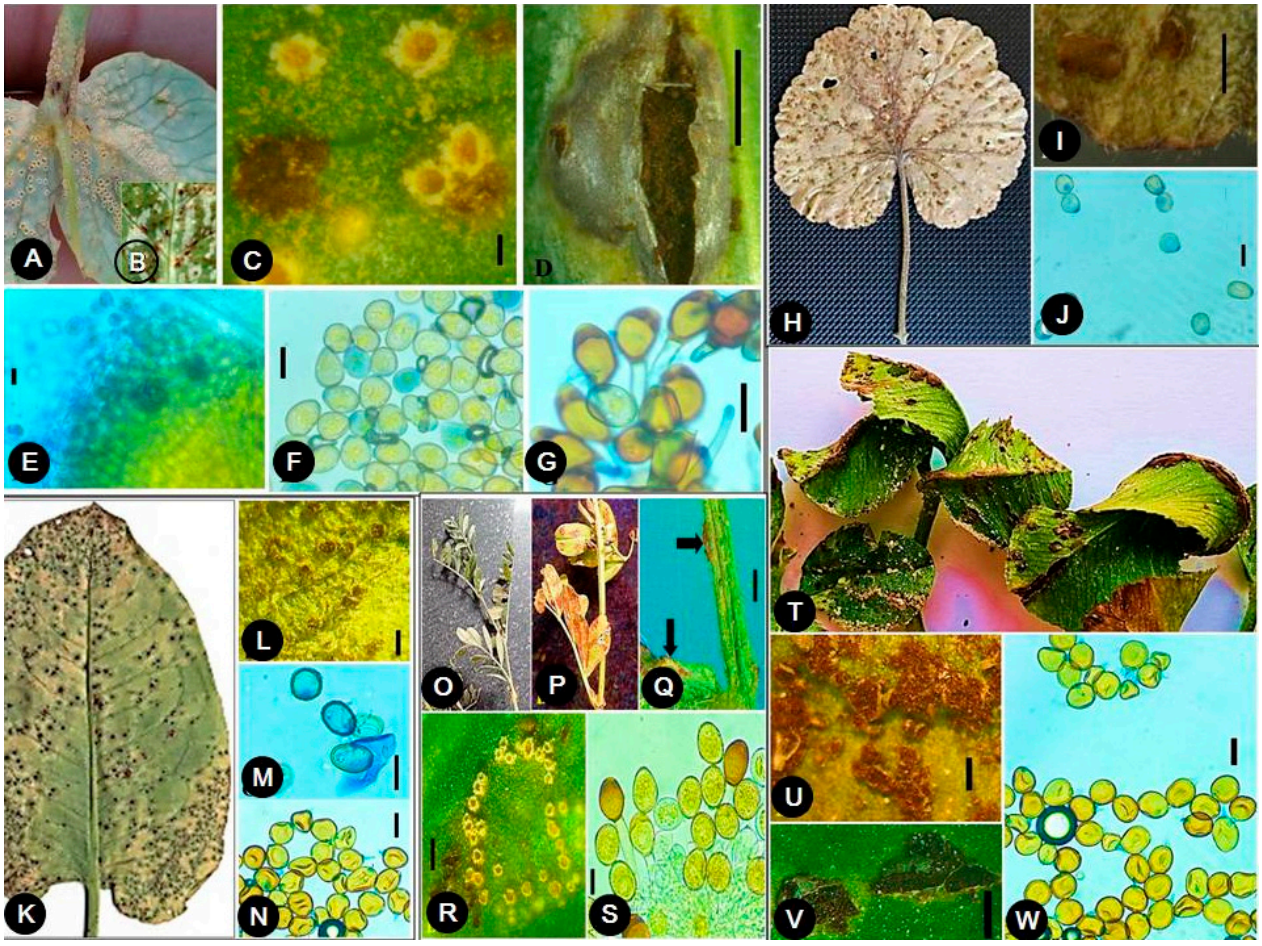

Figure 8. Occurrence of *Uromyces* species with some host plants. (**A**–**G**) *Uromyces fabae* on *Pisum sativum* (pea). (**A**) Aecia; (**B**,**C**) Uredia; (**D**) Telia; (**E**) Aeciospores; (**F**) Urediospores; (**G**) Teliospores; (**H**–**J**) *Uromyces geranii* on *Geranium* sp.; (**H**,**I**) Uredia; (**J**) Uredinospores; (**K**–**N**) *Uromyces rumicis* on *Rumex* sp; (**K**,**L**) Uredia; (**M**) Urediospores; (**N**) Teliospores; (**O**–**R**) *Uromycesviciae-fabae* on *Vicia faba;* (**O**–**Q**) Different rust sorus on natural host; (**R**) Aecia; (**S**) Urediospores and Teliospores; (**T**–**W**) *Uromyces trifolii* on *Trifolium* sp.; (**T**–**V**) Uredia and Telia; (**W**) Teliospores. Scale bars: **C**,**I**,**L**,**Q**,**R**,**U**,**V** = 1 mm; **D** = 0.5 mm; **E**,**F**,**G**,**J**,**M**,**N**,**S**,**W** = 20 µm.

Table 3. Diversity, host range, and distribution of species of *Uromyces*.

Species	Host	Locality	Reference
Uromyces abbreviatus Arthur	*Psoralea purshii* and *P. physodes*	California, Idaho (Western USA), Nevada, and Washington (USA)	[76–78]
Uromyces acantholimonis Syd. & P. Syd.	*Acantholimon libanoticum*	Afghanistan, Iran, Israel, Kazakhstan, Pakistan, and Turkey	[79–81]
Uromyces acetosae J. Schröt.	*Acetosa pratensis*, *Rumex acetosa*, *R. acetosella*, *R. acetoselloides*, *R. alpestris*, and *R. scutatus*	Bulgaria, Czech Republic, China, Czechoslovakia, Finland, Germany, Iceland, México, Norway, Poland, Portugal, Romania, Spain, Sweden, Russia, Taiwan, Turkey, and the United Kingdom	[80,82–84]
Uromyces achrous Syd. & P. Syd.	*Dalbergia sissoo*	India, Pakistan	[85,86]
Uromyces aconiti Fuckel	*Aconitum apetalum*, *A. barbatum*, *A. carmichaelii*, *A. delavayi*, *A. delavayi*, *A. lycoctonum*, *A. macrorhynchum*, *A. monticola*, *A. umbrosum*, *A. umbrosum*, and *A. volubile*	China and Japan	[87–91]
Uromyces aconiti-lycoctoni (DC.) G. Winter	*Aconitum apetalum*	California, Finland, Romania, and Spain	[78,92]
Uromyces acori T.S. Ramakr. & Rangaswami	*Acorus calamus*	India, China, Japan, and Thailand	[93–99]
Uromyces actinostemonis H.S. Jacks. & Holw.	*Actinostemon concolor*	Brazil	[100–103]
Uromyces acuminatus Arthur	*Arenaria lateriflora*, *Collomia linearis*, *Dodecatheon pulchellum*, *Honckenya peploides*, *Lysimachia ciliata*, *Maianthemum canadense*, *Phlox glaberrima*, *P. pilosa*, *Polemonium reptans*, *Smilacina stellate*, *Spartina alterniflora*, *S. alterniflora*, *S. cynosuroides*, *S. gracilis*, *S. patens*, and *S. pectinata*	Alberta, Bulgaria, California, Canada, Colorado, Delaware, Florida, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Montana, New Hampshire, New Jersey, New York, North America, North Dakota, Nova Scotia, Ontario, Quebec, Rhode Island, Saskatchewan, Wisconsin, and Wyoming	[41,104]
Uromyces acutatus Fuckel	*Gagea bohemica* and *G. villosa*	Germany	[105]
Uromyces adelphicus Syd.	*Milium trichopodium*	Syria	[106]
Uromyces aecidiiformis (F. Strauss) C.C. Rees	*Fritillaria pallidiflora*, *F. pineticola*, *F. ussuriensis*, *Lilium bulbiferum*, and *L. candidum*	China, Greece, Germany, Norway, Sweden, and the United Kingdom	[91,105,107–109]
Uromyces aegopogonis Dietel & Holw.	*Aegopogon cenchroides*, *A. geminiflorus*, *A. gracilis*, and *A. tenellus*	México	[106,110]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces aeluropodinus Tranzschel	*Aeluropus littoralis*	Ukraine	[111]
Uromyces aeluropodis-repentis Nattrass	*Aeluropus repens*	Cyprus, Turkey, and Ukraine	[80,106]
Uromyces aemulus Arthur	*Allium acuminatum*, *A. brevistylum*, *A. brandegei*, *A. douglasii*, *A. gooddingii*, *A. tolmiei*, and *A. validum*	Arizona, California, Colorado, Canada, Idaho, Nevada, Utah, Oregon, Washington, and Wyoming	[112–116]
Uromyces affinis G. Winter	*Alstroemeria aurantiaca*, *A. caryophyllaea*, *A. inodora*, *A. isabellana*, *A. nemorosa*, *Curculigo scorzoneraefolia*, *Hypoxis decumbens*, *H. erecta*, and *H. hirsuta*	Brazil, Colombia, Dominica, Dominican Republic, Florida, Missouri, Mississippi, and Puerto Rico	[102,117–125]
Uromyces agnatus Arthur	*Jatropha stimulosa*	Florida	[112]
Uromyces agropyri Barclay	*Agropyron* sp.	India	[126]
Uromyces agrostidis (Gonz. Frag.) A.L. Guyot	*Agrostis capillaris* and *Ranunculus repens*	Europe	[39]
Uromyces aimeae Berndt	*Cucurbitaceae*	Ecuador	[127]
Uromyces airae-flexuosae Ferd. & Winge	*Aira flexuosa*, *Avenella flexuosa*, *Deschampsia beringensis*, *Deschampsia flexuosa*, and *Lerchenfeldia flexuosa*	Bulgaria, Czech Republic, Czechoslovakia, Denmark, Finland, Germany, Poland, and Russia	[82,83,106,128–135]
Uromyces albidum Kirgizb.	*Acanthophyllum pungens*	Uzbekistan	[106]
Uromyces albiziae Henn.	*Albizia procera*	Indonesia	[136]
Uromyces albucae Kalchbr. & Cooke	*Albuca altissima*, *A. aurea*, *A. minor*, *A. canadensis*, *A. juncifolia*, and *A. wakefieldii*	Kenya, Malawi, South Africa	[137–142]
Uromyces albus (Clinton) Dietel & Holw.	*Vicia americana* and *V. linearis*	California and Nebraska	[78,143]
Uromyces algeriensis P. Syd. & Syd.	*Scilla obtusifolia* and *Scilla* sp.	Algeria, Cyprus, and Tunisia	[144,145]
Uromyces alhagi Szemb.	*Alhagi camelorum* and *A. sparsifolium*	Russia and Uzbekistan	[146]
Uromyces allii-monanthi Y. Harada	*Allium monanthum*	Japan	[147]
Uromyces allii-sibirici Gjaerum	*Allium sibiricum*	Norway	[148,149]
Uromyces allii-victorialis Liou & Y.C. Wang	*Allium fistulosum*, *A. macrostemon*, and *A. victorialis*	China	[90]
Uromyces aloes (Cooke) Magnus	*Aloe* spp.	India, Japan, and South Africa	[43,133,139,150–154]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces alopecuri Seym.	*Alopecurus aequalis*, *A. amurensis*, *A. arundinaceus*, *A. arundinaceus*, *A. geniculatus*, *A. japonicas*, *A. pratensis*, *Ranunculus sceluratus*, *R. sieboldii*, and *R. vernyi*	China, Colorado, Japan, Iowa, Minnesota, Nebraska, Texas, Turkey, and Wyoming	[80,92,96,155,156]
Uromyces alpestris Tranzschel	*Euphorbia cyparissias*	Bulgaria, Germany, Spain, and Switzerland	[82,157–160]
Uromyces alsinis Tranzschel	*Minuartia hamata* and *M. meyeri*	Turkey	[80,161]
Uromyces alstroemeriae (Dietel) Henn.	*Alstroemeria revoluta*, *A. aurantiaca*, *A. caryophyllaea*, *A. inodora*, *A. ligtu*, *A. isabellana*, *A. nemorosa*, and *A. subrosulacea*	America, Argentina, Brazil, and Chile	[143,162–167]
Uromyces alysicarpi Wakef. & Hansf.	*Alysicarpus glumaceus*, *A. monilifer*, *A. vaginalis*, and *A. violaceus*	India, Malawi, Uganda, South Africa, and Zambia	[138,139,141,168–172]
Uromyces alyxiae Arthur	*Alyxia oliviformis*	Hawaii	[173–176]
Uromyces ambiens Cooke	*Buxus sempervirens* and *B. wallichiana*	India and Pakistan	[177,178]
Uromyces ambiguus (DC) Lév.	*Allium ampeloprasum*, *A. angulosum*, *A. atroviolaceum*, *A. babingtonii*, *A. descendens*, *A. fistulosum*, *A. rotundum*, *A. schoenoprasum*, *A. sibiricum*, *A. ursinum*, *A. vineale*, and *A. waldsteinii*	Bulgaria, Finland, Germany, Greece, Japan, Poland, Romania, Ukraine, and the United Kingdom	[82,105,133,135,145,179]
Uromyces americanus Speg.	*Cicuta bulbifera*, *Hydrocotyle bonariensis*, *H. umbellata*, *Oenanthe sarmentosa*, *Scirpus americanus*, *S. acutus*, *S. californicus*, *S. lacustris*, *S. olneyi*, *S. validus*, *Sium cicutifolium*, and *Sium suave*	Alabama, Argentina, Canada, California, Delaware, Indiana, Nebraska, Puerto Rico, Texas, Uruguay, Virgin Islands, West Indies, and Wisconsin	[180–185]
Uromyces amoenus Syd. & P. Syd.	*Anaphalis alpicola*, *A. busua*, *A. contorta*, *A. margaritacea*, and *Gnaphalia margaritacea*	Canada, California, China, Idaho, Japan, Michigan, Montana, Nepal, Oregon, Russia, South Dakota, and Washington	[79,94,186–190]
Uromyces amphidymus Syd. & P. Syd.	*Glyceria acutiflora*, *G. borealis*, *G. fluitans*, and *G. septentrionalis*	America, Indiana, New Jersey, Rhode Island, and Wisconsin	[79,191–193]
Uromyces amphilophis-insculptae T.S. Ramakr., Sriniv. & Sundaram	*Amphilophis insculpta*	India	[194]
Uromyces amurensis Kom.	*Maackia amurensis*, *M. floribunda*, *M. hupehensis*, *M. tashiroi*, and *M. reticulata*	China, Japan, Korea, and Russia	[92,94,96,108,109]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces anabasis Kazenas	*Anabasis aphylla*	China	[195]
Uromyces anagyridis Roum.	*Anagyris foetida*, *A. mongolicus*, *A. nanus*, *Piptanthus concolor*, and *P. nepalensis*	China, Cyprus, Greece, Iraq, Israel, Spain, and Turkey	[80,81,96,108,109,196–198]
Uromyces andropogonis Tracy	*Andropogon elliottii*, *A. emersus*, *A. glomeratus*, *A. perforatus*, *A. ternarius*, *A. saccharoides*, *A. virginicus*, *Sorghum halepense*, *Viola papilionacea*, *V. pedata*, *V. pedata*, *V. striata*, and *V. tricolor*	Alabama, Arkansas, Bolivia, Carolina, Chile, Columbia, Connecticut, Delaware, Ecuador, Florida, India, Indiana, Illinois, Jersey, Kentucky, Louisiana, Maryland, Mississippi, Missouri, New North Georgia, New York, Ohio, Tennessee, Texas, and Virginia	[171,172,199–205]
Uromyces andropogonis-annulati Syd., P. Syd. & E.J. Butler	*Andropogon annulatus*, *A. abyssinicus*, *A. brevifolius*, *A. brevifolius*, *A. hirtiflorus*, *A. ischaemum*, *A. longipes*, *A. multinervis*, *A. pilosellus*, *A. platyphyllus*, *A. schottii*, *Bothriochloa insculpta*, *B. ischaemum*, *B. pertusa*, *Cymbopogon giganteus*, *Dichanthium annulatum*, *D. aristatum*, *D. caricosum*, *D. nodosum*, *Exotheca abyssinica*, *Hemarthria altissima*, *Hyparrhenia hirta*, *Monocymbium ceresiiforme*, and *Themeda triandra*	Barbados, Cuba, Ethiopia, Guatemala, India, Kenya, Malawi, Mauritius, México, New Guinea, Pakistann, Philippines, Uganda, Sierra Leone, Sudan, Tunisia, and West Indies	[85,87,88,122,139,168,171,172,201, 206–209]
Uromyces anguriae H.S. Jacks. & Holw.	*Anguria warmingiana*, *Gurania pycnocephala*, *Helmontia cardiophylla*, and *Wilbrandia verticillata*	Brazil and French Guiana	[127,210–212]
Uromyces anomathecae Cooke	*Anomatheca cruenta*	South Africa	[123,138,169,213]
Uromyces anotidis Petch	*Anotis richardiana*	Sri Lanka	[214]
Uromyces anotidis-monospermatis T.S. Ramakr. & Sundaram	*Anotis monosperma*	India	[215]
Uromyces anthacanthi H.S. Jacks.	*Anthacanthus spinosus*	Puerto Rico, Virgin Islands, and West Indies	[125,184,216–218]
Uromyces anthemophilus Vestergr.	*Bauhinia longifolia* and *Bauhinia* sp.	Mato Grosso	[102,219]
Uromyces antholyzae Syd. & P. Syd.	*Antholyza abyssinica*	Ethiopia and South Africa	[138,142,169]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces anthyllidis (Grev.) J. Schröt.	*Anagyris* spp., *Astragalus* spp., *Benedictella* spp., *Coronilla* spp., *Dorycnium* spp., *Hedysarum* spp., *Hippocrepis* spp., *Lathurus* spp., *Lotus* spp., *Lupinus* spp., *Medicago* spp., *Ononis* spp., *Trifolium* spp., *Trigonella* spp., and *Vicia* spp.	Algeria, Armenia, Austria, Belarus, Bulgaria, Cyprus, France, Germany, Greece, Hungary, Iran, Itlay, Kyrgyzstan, Libya, Morocco, Palestine, Poland, Portugal, Romania, Spain, Switzerland, Syria, Tunisia, Turkey, Ukraine, Ukraine, and Yugoslavia	[81,220–222]
Uromyces antiguanus Cummins	*Desmodium orbiculare* and *Desmodium* sp.	Guatemala (USA) and México	[171,172,223–225]
Uromyces antioquiensis Mayor	*Rhynchospora polyphylla* and *R. nervosa*	Colombia	[119,226,227]
Uromyces antipae Săvul. & O. Săvul.	*Rosa lutea*	Romania	[228]
Uromyces aphelandrae Syd.	*Aphelandra pectinata*	Costa Rica	[218,224,229]
Uromyces apiosporus Hazsl.	*Primula minima* and *Primula suffrutescens*	Austria, Bulgaria, Germany, Poland, Romania, and California	[78,82,135,230,231]
Uromyces apludae Syd., P. Syd. & E.J. Butler	*Apluda mutica*, *Indigofera linifolia*, and *I. cordifolia*	India, Guinea, Pakistan, and Philippines	[85,208,232,233]
Uromyces appelianus Gassner	*Passiflora foetida* and *Cayaponia* sp.	Brazil, India, and Uruguay (USA)	[127,211,212,234]
Uromyces appendiculatus (Pers.) Link	*Amphicarpaea* spp., *Cajanus* sp., *Dolichos* spp., *Lablab* sp., *Phaseolus* spp., and *Vigna* spp.	Worldwide	[92,195,235–238]
Uromyces appendiculatus var. *azukicola* Hirata	*Phaseolus angularis*	Japan	[239]
Uromyces aquiriensis Berndt	*Cucurbitaceae*	Acre (Israel)	[127]
Uromyces araucanus Dietel & Neger	*Senecio otites*	La Araucania (Chile)	[162,240]
Uromyces archerianus Arthur & Fromme	*Chloris elegans*	Africa, China, Kenya, Malawi, and México (USA)	[108–110,171,172,241–245]
Uromyces arenariae Tranzschel	*Arenaria graminea*, *A. gypsophiloides*, and *A. serpyllifolia*	Armenia, Romania, and Turkey	[80,161,246]
Uromyces arenariae-grandiflorae Mayor	*Arenaria saponarioides*	Turkey	[80]
Uromyces argaeus Maire	*Rumex tuberosus*	Asia	[247]
Uromyces argutus F. Kern	*Spartina alterniflora* and *S. glabra*	Florida	[106,242,248]
Uromyces argyrolobii Doidge	*Argyrolobium amplexicaule* and *Sesbania* sp.	KwaZulu-Natal and Zimbabwe (South Africa)	[138,249,250]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces ari-triphylli (Schwein.) Seeler	*Arisaema* spp., *Peltandra virginica*, and *Zantedeschia* sp.	Britain, California, Canada, Florida, Indiana, Illinois, Iowa, Minnesota, Mississippi, México, Washington, and Virginia	[185,187,251–256]
Uromyces arizonicus Tracy & Galloway	*Eriogonum racemosum*	Arizona (USA)	[257]
Uromyces armeriicola Speg.	*Armeria chilensis*	North, Central, and South America, and West Indies	[120,125,258–265]
Uromyces asclepiadis Cooke	*Asclepias* spp.	Argentina, Brazil, Bolivia, Colombia, Cuba, California, Florida, Maine, Peru, Puerto Rico, México, and Texas	[100,118,119,123,124,262,266]
Uromyces asperulae McAlpine	*Asperula conferta* and *A. oligantha*	Australia	[267,268]
Uromyces aspiliae H.S. Jacks. & Holw.	*Aspilia phyllostachya*, *Aspilia* sp., and *Wedelia saltensis*	Argentina and Rio de Janeiro (Brazil)	[102,210,269]
Uromyces aspiliellus Vienn. -Bourg.	*Aspilia latifolia*	Ivory Coast	[270]
Uromyces aspiliicola Cummins	*Aspilia asperifolia*, *A. africana*, *A. kotschyi*, *Guizotia* sp., and *Wedelia* sp.	Malawi, Sudan, Tanzania, and Uganda	[168,271–275]
Uromyces astragali-alopecuri Gjaerum	*Astragalus alopecurus*	Turkey	[276]
Uromyces astragali-atropilosuli Gjaerum	*Astragalus atropilosulus* var. *bequaertii*	Kenya	[276]
Uromyces astragalicola Henn.	*Astragalus adsurgens*	North Dakota and Utah	[277,278]
Uromyces astragali-pseudoutrigeris Gjaerum	*Astragalus pseudoutriger*	Turkey	[276]
Uromyces atlanticus Guyot & Malençon	*Hippocrepis scabra*	Morocco	[279]
Uromyces atriplicis McAlpine	*Atriplex confertifolia*, *A. paludosa*, *A. semibaccata*, and *A. vesicaria*	Australia, Britain, and Colorado	[280–282]
Uromyces atropidis Tranzschel	*Atropidis distantis*	Turkey	[161]
Uromyces aureus Dietel & Holw.	*Allium trinulatum*, *A. validum*, *Allium* sp., and *Chlorogalum pomeridianum*	California and Washington (USA)	[78,186,187]
Uromyces auriculae (Magnus) A. Buchheim	*Primula auricula*	Austria and Germany	[160,283]
Uromyces azorellae Cooke	*Pozoa trifoliate* and *Schizeilematrifolio latum*	New Zealand	[213,284]
Uromyces babianae Doidge	*Babiana disticha*	Western Cape Province (South Africa)	[249,285]
Uromyces baccarinii Syd. & P. Syd.	*Wedelia* sp.	Eritrea	1937 [286,287]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces badius Syd.	*Haemanthus coccineus*, *H. pumilio*, *H. rotundifolius*, and *H. sanguineus*	South Africa	[138,167,288]
Uromyces baeumlerianus Bubák	*Melilotus* spp.	Austria, Bulgaria, China, Czech Republic, Hungary, India, Israel, Japan, Poland, Spain, Romania, Turkey, and Ukraine	[81,82,96,289,290]
Uromyces bahiensis Perd. Sánch.	*Loranthaceae*	Panama	[15]
Uromyces basellae Syd. & P. Syd.	*Basella rubra*	Malaysia	[15]
Uromyces bauhiniae Henn.	*Bauhinia bongardii*, *B. cuyabensis*, *B. hiemalis*, *B. longiflora*, *B. pauletia*, and *B. ungulata*	Brazil and México	[102,291,292]
Uromyces bauhiniicola Arthur	*Bauhinia chlorantha* and *B. pringlei*	México	[291]
Uromyces beckeropsidis E. Castell.	*Beckeropsis nubica*	Eritrea and Euthopia	[106,293,294]
Uromyces beckmanniae H.S. Jacks.	*Beckmannia eruciformis* and *B. syzigachne*	Oregon	[295]
Uromyces behenis (DC.) Unger	*Silene* spp.	Worldwide	[296,297]
Uromyces belemensis F.C. Albuq. & Figueiredo	*Ormosia nobilis*	Brazil	[219,298]
Uromyces beloperones G.F. Laundon	*Beloperone californica*, *B. purpusii*, and *Jacobinia mexicana*	Arizona, California, and México	[116,218,299,300]
Uromyces bermudianus Cummins	*Cyperus paniculatus*	Bermuda	[224,233]
Uromyces bethelii Arthur	*Silene verecunda*	California	[301]
Uromyces beticola (Bellynck) Boerema, Loer. & Hamers	*Beta vulgaris*	Bulgaria, Israel, and Turkey	[80–82,302]
Uromyces bicolor Ellis	*Allium* spp.	California, Idaho, Kansas, Massachusetts, Missouri, Montana, Maine, New York, Ohio, and Texas	[186,191,303–305]
Uromyces bidenticola (Henn.) Arthur	*Bidens* spp. and *Cosmos caudatus*	Africa, Asia, Central and South America, and the Southern United States	[96,121,306–310]
Uromyces bidentis Lagerh.	*Bidens* spp. and *Cosmos caudatus*	Central and South America, Southern United States, and West Indies	[118,119,152,184,264,311–313]
Uromyces bisbyi Savile	*Eriogonum parvifolium*	California	[314]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces blainvilleae Berk.	*Blainvillea* spp.	Brazil, Chinas, India, Nigeria, Sri Lanka, and Tanzania	[152,195,210,315–317]
Uromyces blandus Syd.	*Phragmites vulgaris*	China and Philippines	[318,319]
Uromyces boissierae Vienn. Bourg.	*Boissiera pumilio*	Iran	[320]
Uromyces bolusii Massee	*Aspalathus pachyloba*	South Africa	[138,321,322]
Uromyces bomareae Henn.	*Bomarea* sp.	Brazil	[167,261,323]
Uromyces bonaerensis Speg.	*Gomphrena elegans*	Buenos Aires	[324]
Uromyces bonae-spei Bubák	*Tritonia scillaris* and *Acidanthera pallida*	Southern Africa	[325]
Uromyces bonaveriae P. Syd.	*Bonaveria securidaca* and *Securigera securidaca*	Greece	[326,327]
Uromyces borealis Peck	*Hedysarum boreale*, *H. mackenzii*, and *Rumex arifolius*	Canada and Finland	[328,329]
Uromyces bornmuelleri Magnus	*Bongardia chrysogonum* and *Leontice armeniaca*	Cyprus, Iran, Iraq, Israel, and Turkey	[81,196,330]
Uromyces borreriae Henn.	*Borreria verticillata*	Rio de Janeiro (Brazil)	[331]
Uromyces bosseri Vienn. Bourg.	*Trochomeriopsis diversifolia*	Madagascar	[127,332]
Uromyces bothriochloae-intermediae Gorlenko	*Bothriochloa intermedia*	China	[108,109]
Uromyces bouvardiae Syd. & P. Syd.	*Bouvardia* spp.	Guatemala and México	[281,292,333]
Uromyces bradburyae H.S. Jacks. & Holw.	*Bradburya pubescens*, *B. virginiana*, *Centrosema pubescens*, and *C. virginianum*	Brazil	[101,102]
Uromyces brandzae Săvul.	*Lathyrus aureus*, *L. venetus*, and *Orobus vernus*	Romania and Ukraine	[111,126,228]
Uromyces brasilianus Speg.	*Senecio brasiliensis*	Buenos Aires	[334]
Uromyces brasiliensis Trotter	*Jacquemontia* spp.	Brazil, China, and México	[102,335,336]
Uromyces bravensis Cummins	*Sporobolus argutus* and *S. pyramidalis*	The Dominican Republic and Texas	[171,172,337]
Uromyces bresadolae Tranzschel	*Euphorbia* sp.	Itlay	[157]
Uromyces briardii Har.	*Euphorbia* sp.	Germany	[338]
Uromyces brizae Gäum., E. Müll. & Terrier	*Briza media*	France	[339]
Uromyces brodiaeae Ellis & Harkn	*Brodiaea* spp., *Hookera hyacinthina*, and *Triteleia ixioides*	California, Oregon, and Washington (USA)	[187,340]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces bromicola Arthur & Holw.	*Bromus coloratus* and *B. lithobius*	Chile	[199]
Uromyces brominus Gucevič	*Bromus riparius*	Ukraine and Russia	[106,111]
Uromyces buforrestiae Cummins	*Buforrestia imperforata*	Ghana	[341]
Uromyces bugranae A.L. Guyot	*Ononis columnae* and *O. striata*	France, Switzerland	[342]
Uromyces bulbinicola Doidge	*Bulbine bulbosa*	South Australia	[249,343]
Uromyces bulbinus Thüm.	*Bulbine* sp.	Australia and New Zealand	[344]
Uromyces bunsteri (Neger) H.S. Jacks. & Holw.	*Sisyrinchium cuspidatum*, *S. graminifolium*, and *Sisyrinchium* sp.	Chile	[166]
Uromyces bupleuri Magnus	*Bupleurum* spp.	China, Greece, Iran, Morocco, and Tibet	[91,190,220,345,346]
Uromyces bylianus Doidge	*Liliaceae*	KwaZulu-Natal	[249]
Uromyces cacaliae (DC.) Unger	*Adenostyles* spp. and *Cacalia* spp.	Austria, Germany, Japan, Poland, Romania, Russia, and Switzerland	[92,135,159,160]
Uromyces cacciniae Jørst.	*Caccinia strigosa* and *Mattiastrum* sp.	Afghanistan and Iran	[347,348]
Uromyces cachrydis Har.	*Cachrys pterochlaena*, *Hippomarathrum boissieri*, *H. crassilobum*, *H. siculum*, and *Prangos* sp.	Cyprus, Israel, Libya, Morocco, and Portugal	[81,349]
Uromyces caladii (Schwein.) Farl.	*Arisaema* spp., *Peltandra* spp., and *Muricauda dracontium*	Carolina, Georgia, Iowa, Minnesota, México, Missouri, Oklahoma, Texas, and West Virginia	[133,155,253,255]
Uromyces calamagrostidis Uljan.	*Calamagrostis arundinacea*	The former Soviet Union	[106]
Uromyces callicarpae (Petch) Fujik. ex S. Ito	*Callicarpa* spp.	China, Japan, and Taiwan	[94,96,97]
Uromyces calopogonii Cummins	*Calopogonium galactioides*	Guatemala	[171,172,224,350]
Uromyces calotheus Syd.	*Urginea*	Sierra Leone	[351]
Uromyces calycotomes Gäum. & Terrier	*Calycotome spinosa*	France	[220]
Uromyces calystegiae de Bary ex Fuckel	*Convolvulus arvensis*	America, Australia, Italy, and Germany	[352]
Uromyces camphorosmae (Castagne) Har.	*Camphorosma monspeliaca*	France	[353]
Uromyces canavaliae J.M. Yen	*Canavalia microcarpa*	China and Taiwan	[97,108,109]
Uromyces capensis Doidge	*Oenothera biennis*	Western Cape Province	[138]
Uromyces capitatus Syd. & P. Syd.	*Desmodium yunnanensis*	China, India, and Pakistan	[96,156,354–357]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces caraganae (Thüm.) Magnus	*Caragana arborescens*	Portugal	[358,359]
Uromyces caraganicola Henn.	*Caragana chamlagu*	Asia, Africa, and Europe	[81,225,236,360–363]
Uromyces caricis-brunneae Morim.	*Carex brunnea*	Japan	[94]
Uromyces caricis-dolichocarpae Azbukina	*Carex dolichocarpa*	Sakhalin (Russia)	[364]
Uromyces caricis-rafflesianae Mayor	*Carex rafflesiana*	Philippines	[365]
Uromyces caricis-schmidtii Tomilin	*Carex schmidtii*	Khabarovsk	[297,366]
Uromyces caricis-sempervirentis E. Fisch.	*Carex sempervirens*, *C. sempervirens*, *C. stenophylla*, *Phyteuma betonicifolium*, and *P. orbiculare*	Austria, Europe, Germany, Poland, Romania, Switzerland, and Turkey	[43,80,160]
Uromyces carneus (Nees) Har.	*Astragalus alpinus* and *Oxytropis campestris*	Finland and Wyoming	[329,367,368]
Uromyces carpathicus Namysł.	*Geranium phaeum*	Poland	[369,370]
Uromyces carthagenensis Speg.	*Manihot* spp.	Argentina, Brazil, and Uruguay	[371,372]
Uromyces cassiae-mimosoidis (Doidge) Doidge	*Cassia mimosoides* and *Chamaecrista mimosoides*	South Africa	[138,171,172,285]
Uromyces castaneus P. Syd. & Syd.	*Desmodium incanum*, *D. purpureum*, and *Desmodium* sp.	Argentina and Brazil	[171,269]
Uromyces cayaponiae Henn.	*Cayaponia* sp.	Santa Catarina	[127]
Uromyces cearensis Berndt & F.O. Freire	*Ipomoea* sp.	Brazil	[373]
Uromyces cedrelae (Henn.) Henn.	*Toona serrata*	Indonesia	[177,374]
Uromyces celosiae Dietel & Holw.	*Celosia latifolia*	Argentina, Brazil, Costa Rica, Cuba, Jamaica, and México	[167,263,269,308,375,376]
Uromyces celtidis Dietel	*Celtis* sp.	Brazil	[102,375]
Uromyces cenisiae A.L. Guyot	*Ononis cenisia*	France	[342]
Uromyces ceratocarpi Syd. & P. Syd.	*Ceratocarpus arenarius*	China and Russia	[91,144]
Uromyces cestricola Speg.	*Cestrum pubeens* and *C. strigilatum*	Argentina and Bolivia	[334,377]
Uromyces chaetobromi Gjaerum	*Chaetobromus dregeanus* and *C. schraderi*	South Africa	[244,378]
Uromyces chaetolimonis Korbonsk.	*Chaetolimon sogdianum*	Tajikistan	[379]
Uromyces charmelii Liou	*Phyteuma charmelii*	France	[380]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces chenopodii J. Schröt	*Chenopodium* sp., *Salsola* spp., and *Suaeda* spp.	Around the world	[381]
Uromyces chenopodii-fruticosi (DC.) M. Abbasi & Aime	*Suaeda maritima*	England and Germany	[47]
Uromyces chesneyae Tranzschel & Erem.	*Chesneya astragalina*	Central Asia and Russia	[382,383]
Uromyces chevalieri A.L. Guyot	*Drimiopsis* sp.	Chari and Tropical Africa	[384,385]
Uromyces chilensis Dietel & Neger	*Lathyrus magellanicus* and *L. multiceps*	Chile	[162,386]
Uromyces chiovendae Bacc.	*Cissus* sp.	Somalia	[287]
Uromyces chloridis Doidge	*Chloris myriostachya*, *C. pilosa*, and *C. virgate*	Uganda and South Africa	[138,249]
Uromyces chlorogali Dietel & Holw.	*Chlorogalum pomeridianum*	California and Washington (USA)	[186,187,387]
Uromyces chorizanthis Ellis & Harkn.	*Chorizanthe pungens*	California	[340,388]
Uromyces christensenii J. Anikster & I. Wahl	*Muscari parviflorum* and *Hordeum bulbosum*	Israel	[389,390]
Uromyces chubutensis Speg.	*Poa chubutensis*	Chubut	[391]
Uromyces ciceris-arietini (Grognot) Jacz. & G. Boyer	*Cicer arietinum*, *Trigonella polycerata*, and *Vicia* spp.	Brazil, India, Kenya, Libya, México, Morocco, and Pakistan	[81,221,357,392]
Uromyces ciceris-soongaricae S. Ahmad	*Cicer songaricum*	Pakistan	[393]
Uromyces circinalis Kalchbr. & Cooke	*Scilla prasina*	South Africa	[138]
Uromyces circumscriptus Neger	*Loranthus* spp., *Struthanthus complexus*, and *Phrygilanthus* spp.	Argentina, Brazil, and Chile	[394]
Uromyces cisneroanus Speg.	*Excoecaria biglandulosa* var. *serrata* and *Sapium* spp.	Argentina, Brazil, Paraguay, and Venezuela	[100,101,103,269,324]
Uromyces cladomanes Traverso	*Vitis* sp.	Somalia	[287]
Uromyces cladrastidis Kusano	*Cladrastis shikokiana*	Japan	[92]
Uromyces clarus H.S. Jacks. & Holw.	*Iresine angustifolia*, *I. celosia* and *Iresine* sp.	Bolivia, Brazil, Cuba, Venezuela, and West Indies	[167,263,376]
Uromyces clavatus Dietel	*Lathyrus* spp. and *Vicia* spp.	Argentina, Chile, and Uruguay	[143,240,395]
Uromyces claytoniae Cooke & Peck	*Claytonia caroliniana*	Canada and New York	[104,185,396]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces clignyi Pat. & Har.	*Andropogon* spp., *Bothriochloa* spp., *Capillipedium* sp., *Cymbopogon* sp., *Dichanthium* spp., *Eremopogon* sp., *Exotheca* sp., *Hemarthria* spp., *Heteropogon* sp., *Monocymbium* sp., *Schizachyrium* sp., *Sorghum* sp., and *Themeda* spp.	Uganda, Australia, Cameroon, China, Ethiopia, Ghana, Guatemala, India, Japan, Kenya, México, Nepal, Nigeria, Pakistan, South Africa, Tanzania, Uganda, and Zambia	[110,152,171,172,243,244,356,397]
Uromyces clignyioides Gjaerum	*Monocymbium ceresiiforme*	Zimbabwe	[244]
Uromyces clitoriae Arthur	*Clitoria mexicana*	México	[172,398]
Uromyces clivalis Mitter	*Argyrolobium flaccidum*	India	[357,399]
Uromyces clutiae Kalchbr. & Cooke	*Clutia* sp.	Kenya	[400]
Uromyces cnidoscoli Henn.	*Cnidoscolus vitifolius* and *Jatropha* sp.	Argentina and Brazil	[103,282,291]
Uromyces cobresiae Korbonsk.	*Carex* sp.	Uzbekistan	[146]
Uromyces colchici Massee	*Colchicum spectabile* and *C. bavaricum*	Great Britain and Turkey	[133,401,402]
Uromyces collinus J.F. Hennen & Cummins	*Bauhinia* sp.	México	[133,292,403]
Uromyces cologaniae Arthur	*Cologania* spp. and *Teramnus uncinatus*	Costa Rica, Guatemala, México, Puerto Rico, and Venezuela	[259,281,306,310,398]
Uromyces coloradensis Ellis & Everh.	*Astragalus* sp. and *Vicia* spp.	Arizona, California, Canada, Colorado, Iowa, Utah, Washington, and Wisconsin (USA)	[225,404]
Uromyces columbianus Mayor	*Melanthera* spp.	Florida, West Indies, and Central and South America	[76,77,120,122,226,306]
Uromyces coluteae Arthur	*Colutea arborescens*	Austria	[299]
Uromyces combreti Thaung	*Combretum*	Myanmar	[405]
Uromyces comedens P. Syd. & Syd.	*Jasminum pubescens*	India and Dominican Republic	[118,119,144,224,406]
Uromyces commelinae Cooke	*Amischotolype* sp., *Aneilema* spp., *Callisia* spp., *Commelina* spp., *Cyanotis* spp., *Cyanotis* spp., *Pollia* spp., *Tradescantia* spp., *Tripogandra* sp., and *Zebrina* sp.	Worldwide	[222,407]
Uromyces compactus Peck	*Aster spinosus, Boltonia diffusa*, and *Baccharis* sp.	Arizona, México, and Texas	[116,337,408,409]
Uromyces comptus P. Syd. & Syd.	*Ipomoea bipinnatipartita*	Namibia, South Africa, and Tanzania	[126,138,165,384]
Uromyces congoensis Syd. & P. Syd.	*Bauhinia* sp.	The Democratic Republic of the Congo	[410]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces conicus Jørst.	*Cleome* sp.	Bolivia	[411]
Uromyces coordinatus Arthur	*Euphorbia* spp. and *Tithymalus palmeri*	California and Utah	[103,114,404,412]
Uromyces corallocarpi W.T. Dale	*Corallocarpus emetocatharticus* and *Doyerea emetocathartica*	Trinidad and Tobago, México, and West Indies	[127,211,212,308]
Uromyces cordiae Henn.	*Cordia* sp.	Rio de Janeiro	[413]
Uromyces coronatus Yoshin.	*Helictotrichon milanjianum*, *Oryza sativa*, *Zizania* spp., and *Zizaniopsis* sp.	China, Florida, Hong Kong, Japan, Korea, Taiwan, Thailand, and Uganda	[39,94–97,262,414]
Uromyces coronillae Vienn.-Bourg.	*Coronilla rostrate* and *C. varia*	Israel and Switzerland	[81,220]
Uromyces correntinus J.C. Lindq.	*Rhynchospora tenuis*	Argentina	[415]
Uromyces corrugatus Speg.	*Vicia patagonica*	Argentina and Brazil	[126,180]
Uromyces costaricensis Syd.	*Lasiacis* sp. and *Panicum altissimum*	Brazil, Colombia, Costa Rica, Florida, México, Puerto Rico, and Venezuela	[106,229,294]
Uromyces costesianus Speg.	*Sphaeralcea velutina*	Chile	[386,416]
Uromyces crassipes Dietel & Neger	*Rumex* spp.	Argentina, Chile, and Peru	[269,281,376,417]
Uromyces crassivertex Dietel	*Lychnis miqueliana* and *Lychnis* sp.	China and Japan	[92,94,418]
Uromyces crepidis-fraasii Kaps. Gotsi	*Crepis fraasii*	Greece	[419]
Uromyces cretensis Petr.	*Coronilla parviflora* and *C. rostrata*	Greece	[420,421]
Uromyces cristatulus Tranzschel	*Euphorbia* sp.	Australia, Germany, Hungary, and Russia	[157]
Uromyces cristatus J. Schröt. & Niessl	*Dianthus caryophyllus*, *Lychnis viscaria*, *Viscaria alpina*, and *V. vulgaris*	Portugal, Czechoslovakia, Denmark, Finland, Greece, Norway, Poland, and Sweden	[105,128,129,135,158]
Uromyces cristulatus Tranzschel	*Euphorbia barrelieri*, *E. petrophila*, *E. salicifolia*, and *E. seguieriana*	Bulgaria and Ukraine	[82,111,157,422]
Uromyces croci Pass.	*Crocus* spp.	Bulgaria, Israel, Romania, Russia, and Ukraine	[81,82,165,422]
Uromyces crotalariae-nitens Salazar-Yepes & Buriticá	*Crotalaria nitens*	Colombia	[423]
Uromyces cruchetii Mayor	*Borreria tenella*	Colombia	[226]
Uromyces cruckshanksiae Cummins & Bonar	*Cruckshanksia bustillosii*, *C. palma*, *Oreopolus glacialis*, and *O. palmae*	Argentina and Chile	[233,240,415]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces cucubali Hirats. & Hashioka	*Cucubalus baccifer*	China, Japan, and Taiwan	[89,96,97]
Uromyces cucullatus Syd. & P. Syd.	*Baltimora recta*, *Perymenium* spp., *Wedelia* spp., and *Zexmenia* spp.	Cuba, Costa Rica Guatemala, México, and Panama	[124,281,398,424,425]
Uromyces cucumivorus Berndt	*Cucumis melo* var. *flexuosus*	Iraq	[127]
Uromyces cuenodii Maire	*Silene eriocalycina*	Iraq	[196]
Uromyces cuspidatus G. Winter	*Festuca* spp., *Melica laxiflora*, *Muhlenbergia* spp., and *Poa chubutensis*	Argentina, Bolivia, and Chile	[106,199,240]
Uromyces cyanotidis Cummins	*Cyanotis capitata*	Papua New Guinea	[233,426]
Uromyces cyathulae Henn.	*Cyathula globulifera*	Eritrea	[287,427]
Uromyces cyperi Henn.	*Cyperus* sp.	Eritrea	[287,427]
Uromyces cypericola Gjaerum	*Cyperus albostriatus* and *C. cyperoides*	Kenya, South Africa, and Uganda	[428,429]
Uromyces cyprius Vienn.-Bourg.	*Rumex cyprius*	Iran	[430]
Uromyces cystopiformis Lagerh.	*Centropogon* sp. and *Siphocampylus* sp.	Costa Rica, Ecuador	[165,310,431]
Uromyces cytisi J. Schröt.	*Caragana arborescens*, *Cytisus polytrichus*, *Genista aucheri*, *G. tinctoria*, and *Laburnum anagyroides*	Russia, Ukraine, and Turkey	[80,111,432]
Uromyces dactylidis G.H. Otth	*Agrostis* spp., *Alopecurus* spp., *Anemone* sp., *Avenula* sp., *Dactylis* spp., *Festuca* spp., *Poa* spp., *Ranunculus* spp., and *Trisetum* sp.	Arizona, Armenia, Australia, Bulgaria, Pakistan, Canada, China, Checz Republic, Czechoslovakia, Denmark, Finland, Germany, Hungary, Japan, New Zealand, Norway, Oklahoma, Pennsylvania, Romania, Spain, Sweden, Switzerland, Ukraine, Virginia, Vermont, and other temperateregions of the world	[43,80,82,105,113,368,409,433–441]
Uromyces dactyloctenii Wakef. & Hansf.	*Dactyloctenium aegyptium*	China, Japan, Kenya, Namibia, Samoa, Tanzania, Tonga, and Uganda	[140,168,274,442,443]
Uromyces dactylocteniicola (Speg.) J.C. Lindq.	*Dactyloctenium aegyptium*	Central Africa, the Philippines, and South America	[106]
Uromyces danthoniae McAlpine	*Danthonia* spp. and *Rytidosperma* spp.	Australia and New Zealand	[245,280,313]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces decoratus Syd. & P. Syd.	*Crotalaria* spp.	China, Costa Rica, Guinea, Ghana, India, Japan, Madagascar, Myanmar, Nigeria, Pakistan, Sri Lanka, Taiwan, Thailand, and Venezuela	[85,86,94,96,97,152,171,172,281,290,312,356,357,444,445]
Uromyces deeringiae Syd. & P. Syd.	*Cladostachys polysperma* and *Deeringia* spp.	China, Japan, India, Indonesia, Philippines, and Taiwan	[92,167,232,309,446,447]
Uromyces delagoënsis Bubák	*Lapeirousia delagoensis*	Mozambique	[249]
Uromyces dendroseridis Keissl.	*Dendroseris micrantha*	Chile	[240]
Uromyces densus Arthur	*Bidens pilosa*	Puerto Rico	[76,77]
Uromyces desmodii Cooke	*Desmodium canescens*	South Carolina and Brazil	[448]
Uromyces desmodiicola Jørst.	*Desmodium albiflorum*	Brazil	[102,171,449]
Uromyces desmodii-leiocarpi Henn.	*Desmodium leiocarpum*	Brazil	[171,450]
Uromyces devoluensis Gäum.	*Senecio doronicum*	France	[451]
Uromyces dianthi (Pers.) Niessl	*Arenaria leptoclados*, *Bufonia* spp., *Cerastium brachypetalum*, *Dianthus* spp., *Euphorbia* spp., *Gypsophila* spp., *Petrorhagia* spp., *Silene* sp., *Vaccaria* sp., and *Vicia* sp.	Australia, Bermuda, Bolivia, Bulgaria, Brazil, California, Chile, Cuba, Germany, Japan, Kenya, Madagascar, New York, Poland, Romania, Spain, Thailand, Texas, Turkey, Ukraine, and Washington (USA)	[80,82,94,105,111,135,140,452]
Uromyces dianthi-caryophylli Monchot	*Dianthus* sp.	France	[453]
Uromyces dichromenae W.T. Dale	*Dichromena radicans*	Jamaica, Trinidad and Tobago, and West Indies	[264,308]
Uromyces dictyospermae Ellis & Everh. ex Tranzschel	*Euphorbia* spp., *Jatropha* spp., and *Tithymalus* sp.	California, Florida, Minnesota, Montana, Oklahoma, and Washington (USA)	[103,157,187,254,262,278,388,454–456]
Uromyces didymae Gapon.	*Veronica polita*	Uzbekistan	[457]
Uromyces dieramatis Doidge	*Dierama* spp.	South Africa	[123,138,139,273,458]
Uromyces dietelianus Pazschke	*Bauhinia* spp.	Argentina, Brazil, and Uruguay	[100,101,269,297]
Uromyces digitariae-adscendentis Y.C. Wang	*Digitaria* spp.	China and Taiwan	[96,97]
Uromyces dilucidus Cummins	*Sisyrinchium striatum*	Argentina	[415,459]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces diniensis A.L. Guyot	*Ononis fruticosa*	France	[460]
Uromyces dinteri Mennicken, W. Maier & Oberw.	*Tetraena* spp.	Namibia and Egypt	[385]
Uromyces dipcadi Gjaerum	*Dipcadi viride*	Kenya	[461,462]
Uromyces discariae G. Cunn.	*Discaria toumatou*	New Zealand	[284,313,463]
Uromyces dispersus Hirats. f.	*Apios fortunei*	Japan	[222]
Uromyces dobremezii Durrieu	*Euphorbia stracheyi*	Nepal	[464]
Uromyces doebbeleri Berndt	*Hypericum irazuense*	Costa Rica	[310]
Uromyces dolichi Cooke	*Dolichos axillaris*	Brazil, China, Madagascar, Puerto Rico, Zimbabwe, and Uganda	[108,109,125,171,172,250,465]
Uromyces dolicholi Arthur	*Cajanus* spp., *Dolicholus* spp. and *Rhyncosia* spp.	Canada, China, Colombia, Costa Rica, Florida, India, Japan, Jamaica, Kenya, Panama, Puerto Rico, South Africa, Taiwan, Texas, Venezuela, and West Indies	[96,97,138,227,310,357,466–469]
Uromyces dolichosporus Dietel & Holw.	*Tournefortia* spp.	Argentina, Brazil, Bolivia, Cuba, Ecuador, Jamaica, México, West Indies, and Venezuela	[100,101,263,269,308,375,456]
Uromyces doricus Maire	*Silene* spp.	Bulgaria and Greece	[82,308,327,470]
Uromyces dorystaechadis Gjaerum & Bahç.	*Dorystaechas hastata*	Turkey	[471]
Uromyces drimiopsidis Doidge	*Drimiopsis maculata*	South Africa	[138]
Uromyces dubiosus Henn.	*Lantana* sp.	Goiás	[291]
Uromyces ducellieri Maire	*Anabasis aphylla*	China	[91,96,472]
Uromyces dusenii Dietel & Neger	*Gilliesia graminea*, *G. monophylla*, *Miersia chilensis*, and *Ornithogalum biflorum*	Chile	[166,240,417]
Uromyces echinodes Kunze ex Henn.	*Asclepiadaceae*	Suriname	[473]
Uromyces ecklonii Bubák	*Freesia refracta*	Kenya and South Africa	[138,140]
Uromyces eclipsis Berndt	*Zygophyllum morgsana*	South Africa	[234]
Uromyces edwardsiae G. Cunn.	*Edwardsia* spp. and *Sophora* spp.	New Zealand	[284,463,474]
Uromyces ehrhartae McAlpine	*Ehrharta stipoides*	Australia and New Zealand	[106,280,313,474]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces ehrhartae-giganteae Doidge	*Ehrharta* spp.	South Africa	[138,249,378,429]
Uromyces elegans (Berk. & M.A. Curtis) Lagerh.	*Trifolium* spp.	Florida, Kenya, Mississippi, Oklahoma, South Carolina, Texas, and Uganda	[168,261,455,475]
Uromyces eleocharidis Arthur	*Eleocharis* spp.	Iowa, Kansas, North and South Dakota, and Washington (USA)	[155,278,301,466,476]
Uromyces ellipticus Dietel & Neger	*Glycyrrhiza astragalina*	Chile	[240,477]
Uromyces ellisianus Henn.	*Euphorbia marginata*	Minnesota	[277]
Uromyces emmeorhizae Syd.	*Emmeorhiza umbellata*	Venezuela	[478]
Uromyces epicampis Dietel & Holw.	*Epicampes macroura*, *Melica laxiflora*, and *Muhlenbergia* spp.	Arizona, California, Chile, Ecuador, Guatemala, México, and Texas	[106,116,199,240,281,337,479]
Uromyces eragrostidicola Gjaerum	*Eragrostis rigidior* and *Eragrostis* sp.	Ethiopia, Kenya, Tanzania, and Zimbabwe	[244]
Uromyces eragrostidis Tracy	*Anthericum torreyi*, *Cypholepis yemenica*, *Desmostachya bipinnata*, *Eragrostis* spp., and *Tripogon chinensis*	Arizona, Argentina, Australia, Botswana, Brazil, China, Georgia, Ghana, India, Israel, Kenya, Malawi, Malaysia, Mississippi, México, Nebraska, Oklahoma, Pakistan, Puerto Rico, South Africa, Texas, West Indies, and Venezuela	[90,110,116,141,171,172,199,208, 243,244,250,480]
Uromyces eriochloae (Syd. & P. Syd.) Syd., P. Syd. & E.J. Butler	*Eriochloa* spp.	China, Indonesia, Japan, Madagascar, and Philippines	[85,90,232,309,465]
Uromyces eriogoni Ellis & Harkn.	*Eriogonum virgatum*	California	[340,388]
Uromyces eriospermi Kalchbr. & Cooke	*Eriospermum* spp.	South Africa, Tanzania, and Zimbabwe	[137,138,250,274]
Uromyces ermelensis Doidge	*Indigofera* sp.	South Africa	[138]
Uromyces ervi (Wallr.) Westend.	*Ervum* spp., *Lens* spp., *Pisum sativum*, and *Vicia* spp.	Algeria, Austria, Belgium, Bulgaria, China, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, Japan, Morocco, Netherlands, Pakistan, Poland, Portugal, Romania, Russia, Spain, Switzerland, Sweden, Taiwan, and Ukraine	[82,96,128,220,393,481,482]
Uromyces erythrinae Lagerh.	*Erythrina* sp.	Ecuador	[165]
Uromyces erythronii (DC.) Pass.	*Erythronium* sp., *Lilium* spp., and *Tulipa* spp.	Bulgaria, China, Germany, Greece, Japan, Japan, Korea, and Spain	[82,92,96,158,179,483]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces eugenei-mayorii M. Morelet	*Ulex europaeus*	Italy	[451]
Uromyces eugentianae Cummins	*Gentiana* spp. and *Halenia guatemalensis*	Canada, Iowa, Norway, and Washington (USA)	[129,187,252,484–486]
Uromyces eulophiae Gjaerum	*Eulophia paivaena* subsp. *borealis*	India, Rwanda, and Uganda	[318,487,488]
Uromyces euphaeus Syd.	*Hypoxis glabella*	Australia	[489]
Uromyces euphlebius Syd. & P. Syd.	*Phoradendron calyculatus*, and *Phoradendron* sp.	México	[15,490]
Uromyces euphorbiae Cooke & Peck	*Acalypha* communis, Chamaesyce sp., *Euphorbia* spp., and *Poinsettia heterophylla*	Afghanistan, Argentina, Azirona, Brazil, California, Canada, China, Cuba, Columbia, Costa Rica, Cyprus, India, Israel, Jamaica, Japan, Mississippi, Mauritius, New York, Pakistan, Panama, South Africa, Texas, Uganda, Venezuela, West Indies, and Zambia	[96,102,203,209,227,255,263,269,300,308,310,318,348,469,475,488,491,492]
Uromyces euphorbiae-connatae Speschnew	*Euphorbia* sp.	Russia	[493]
Uromyces euphorbiae-javanicae E. Fisch.	*Euphorbia javanica*	Indonesia	[309]
Uromyces euphorbiae-lunulatae Liou & Y.C. Wang	*Euphorbia esula*, *E. kansui*, and *E. lunulata*	China	[96,108,109]
Uromyces euphorbiae-nicaeensis Unamuno	*Euphorbia nicaeensis*	Spain	[494]
Uromyces euphorbiae-polytimeticae Zenkova	*Euphorbia polytimetica*	Tajikistan	[495]
Uromyces euphorbiicola (Berk. & M.A. Curtis) Tranzschel	*Euphorbia* spp.	Brazil, Colombia, Madagascar, South Africa, and Zimbabwe	[102,138,157,250,465]
Uromyces eurotiae Tranzschel	*Ceratoides latens*, *Krascheninnikovia ceratoides*, and *K. latens*	China, Turkey, and Uzbekistan	[80,91,146,161]
Uromyces euryopsidicola A.R. Wood & M. Scholler	*Euryops empetrifolius* and *E. tenuissimus*	South Africa, North and Western Cape Province	[496]
Uromyces evastigatus Cummins	*Phthirusa pyrifolia*	El Salvador	[15]
Uromyces fallens (Arthur) Barthol.	*Trifolium pratense*	Iran	[497]
Uromyces fatouae Henn.	*Fatoua pilosa*	Japan	[498]
Uromyces fedtschenkoi Faizieva	*Rumex fedtschenkoi*	Uzbekistan	[457]
Uromyces ferganensis Tranzschel & Erem.	*Stipa caucasica*, *S. holosericea*, and *S. lessingiana*	Iran, Siberia, and Russia	[106,382,499]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces ferrariae Doidge	*Ferraria* sp.	South Africa and Zimbabwe	[138,250]
Uromyces ferulae Juel	*Ferula* spp. and *Heracleum cachemiricum*	Australia, Iran, Israel, Pakistan, and Morocco	[81,500]
Uromyces ferulaginis Lindr.	*Feruladinis silvaticae*	Poland	[501]
Uromyces festucae-nigricantis Gonz. Frag.	*Festuca nigricans*	Morocco and Spain	[279,502]
Uromyces ficariae (Schumach.) Lév.	*Ficaria* spp. and *Ranunculus* spp.	Bulgaria, Czech Republic, Czechoslovakia, Denmark, Finland, Germany, Iran, Norway, Poland, Russia, Sweden, Turkey, and Ukraine	[80,82,83,105,111,128,129,132,432,438,503]
Uromyces fiebrigii Henn. & Vestergr.	*Bauhinia* sp.	Paraguay	[216]
Uromyces fiorianus Sacc.	*Peucedanum fraxinifolium* and *Peucedanum* sp.	South Africa	[138,504]
Uromyces fischerianus Mayor	*Ranunculus glacialis*	Switzerland	[119]
Uromyces fischeri-eduardi Magnus	*Vicia* spp.	Bulgaria, Mongolia, Poland, Romania, and Turkey	[80,82,135,505]
Uromyces flavicomae Liou	*Euphorbia flavicoma*	France	[506]
Uromyces flemmingiae Henn.	*Flemmingia* sp.	Uganda	[507]
Uromyces fleuryae J.M. Yen	*Fleurya podocarpa*	Gabon	[508]
Uromyces floralis Vestergr.	*Bauhinia hiemalis*, *B. cuyabensis*, *B. holophylla*, *B. rufa*, and *Bauhinia* sp.	Brazil	[102,216]
Uromyces floscopae Syd. & P. Syd.	*Floscopaperuviana* and *Floscopa* sp.	Brazil	[102,509]
Uromyces fontii Gonz. Frag.	*Peplis acutangula*	Morocco	[510]
Uromyces formosus Syd. & P. Syd.	*Dianthus libanotis*	Israel and Iran	[81]
Uromyces foveolatus Juel	*Bauhinia hirsuta*, *B. mirandina*, and *Bauhinia* sp.	Brazil	[100–102,511]
Uromyces fragilipes Tranzschel	*Agropyron squarrosum*, *Agrostis* spp., *Deschampsia* spp., *Eremopyrum bonaepartis*, *Festuca* spp., *Hordeum* spp., and *Scribneria bolanderi*	California, Iran, Pakistan, and Russia	[106,161,347,412,512,513]
Uromyces fraserae Arthur & Ricker	*Frasera speciosa*	Wyoming	[514]
Uromyces fremonti Syd. & P. Syd.	*Oenothera fremontii*	Kansas	[79]
Uromyces fulgens Bubák	*Chamaecytisus* spp., *Cytisus* spp., and *Lembotropis nigricans*	Bulgaria, Czech Republic, France, Greece, Hungary, Itlay, Poland, Romania, Russia, Ukraine, and Yugoslavia	[82,220,421]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces fuscatus Arthur	*Polygonum alpinum*	Idaho and Utah	[281]
Uromyces fusisporus Cooke & Massee	*Acacia neriifolia*, *A. salicina*, and *Acacia* sp.	Australia	[177,515]
Uromyces gaeumannii Mayor & Vienn. Bourg.	*Hippocrepis* spp.	France, Greece, Libya, Morocco, Palestine, Portugal, Spain, Tunisia, and Yugoslavia	[220,516]
Uromyces gageae Beck	*Gagea* spp., *Lloydia triflora*, and *Ornithogalum umbellatum*	Austria, Bulgaria, Czech Republic, China, Denmark, Finland, Germany, Japan, Norway, Poland, Romania, Russia, Turkey, Sweden, and Ukraine	[54,80,82,128,135,222,228,440]
Uromyces galactiae Rezende & Dianese	*Galactia pedunculata*	Brazil	[517]
Uromyces galegae Sacc.	*Astragalus glycyphylloides* and *Galega* spp.	Czech Republic, France, Greece, Hungary, Italy, Poland, Russia, Turkey, and Yugoslavia	[80,82,220,421]
Uromyces galegicola Woron.	*Galega orientalis*	Armenia, Romania, and Turkey	[80,228,518,519]
Uromyces galii Dietel	*Galium aparine* and *G. spurium*	Japan	[222,414]
Uromyces galii-californici Linder	*Galium californicum* and *Galium* sp.	California	[520]
Uromyces galphimiae Dietel & Holw.	*Galphimia glauca* and *G. humboldtiana*	México	[456,479]
Uromyces garanbiensis (Hirats. f. & Hashioka) Sawada	*Ehretia dicksonii*	Taiwan	[521]
Uromyces gaubae Petr.	*Caltha introloba*	Australia	[346,522]
Uromyces gausseni Mayor & Vienn.-Bourg.	*Dorycnopsis gerardii*	France	[516]
Uromyces geissorhizae Henn.	*Geissorhiza* sp.	Western Cape Province	[523]
Uromyces gemmatus Berk. & M.A. Curtis	*Convolvulus parviflorus* and *Convolvulus* sp.	Brazil, China, Cuba, Ecuador, India, Japan, Jamaica, México, Taiwan, West Indies, and Venezuela	[94,96,97,100,101,122,264,306,319,524,525]
Uromyces genistae Fuckel	*Cytisus capitatus*, *Genista tinctoria*, *Genista* sp., and *Tithymalus cyparissias*	Czech Republic, Morocco, and Turkey	[80,83,220,525]
Uromyces geranii (DC.) G.H. Otth & Wartm.	*Erodium* spp. and *Geranium* spp.	Australia, Bulgaria, China, Chile, Czech Republic, Denmark, Finland, France, Germany, India, Japan, Kenya, Korea, Norway, Pakistan, Poland, Portugal, Romania, Russia, Spain, Sweden, Turkey, Ukraine, and Zimbabwe	[80,82,87,88,94,96,128,179,208,436,526]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces geraniicola Speg.	*Geranium patagonicum*	Chile	[240,258]
Uromyces ghaznicus Petr.	*Limonium* sp.	Afghanistan	[527]
Uromyces giganteus Speg.	*Kalidium foliatum* and *Suaeda* spp.	Australia, Arizona, China, California, Idaho, Texas, and Ukraine	[47,96,300,337,421]
Uromyces gigantiformis Salazar-Yepes & Buriticá	*Bidens* sp.	Colombia	[423]
Uromyces gilgitae S. Ahmad	*Sophora alopecuorides*	Pakistan	[528]
Uromyces gladioli Henn.	*Babiana* spp., *Geissorhiza* spp., *Gladiolus* spp., *Moraea ramose*, and *Romulea* spp.	Cuba, Kenya, Malawi, Nigeria, South Africa, and Uganda	[138,140,168,273,291,458,529,530]
Uromyces globosus Dietel & Holw.	*Sapium* spp.	México	[103,456,479]
Uromyces glyceriae Arthur	*Glyceria* spp.	Illinois, Indiana, New Jersey, Rhode Island, and Wisconsin (USA)	[39,191,299]
Uromyces glycyrrhizae (Rabenh.) Magnus	*Glycyrrhiza* spp.	Armenia, Algeria, Azerbaijan, Bulgaria, Caucasus, Czech Republic, China, Greece, Iraq, Israel, Itlay, Japan, Kazakhstan, Pakistan, Palestine, Portugal, Romania, Spain, Turkey, and Uzbekistan	[39,78,80–82,91,96,116,146,196,278, 317,327,356,393,409,531–536]
Uromyces gnaphalii Ellis & Everh.	*Gnaphalium* sp.	Colorado	[388]
Uromyces gouaniae F. Kern	*Gouania domingensis*, *G. lupuloides*, *Ledenbergia macrantha*, and *Ledenbergia* sp.	Guatemala and México	[281,486,537]
Uromyces goyazensis Henn.	*Bauhinia* sp.	Brazil	[291,538]
Uromyces graminis (Niessl) Dietel	*Caucalis platycarpos*, *Ferula communis*, *Melica* spp., and *Thapsia garganica*	Afghanistan, Armenia, Bulgaria, Greece, Italy, Morocco, Romania, Spain, Portugal, and Ukraine	[82,111,158,228,348,421,519,534, 539]
Uromyces grandiotii Gäum.	*Ancrumia cuspidata*	Chile	[540]
Uromyces greenstockii Doidge	*Ipomoea greenstockii*	South Africa	[138]
Uromyces guatemalensis Vestergr.	*Bauhinia inermis*, *B. ungulata*, and *Bauhinia* sp.	Costa Rica, El Salvador, Guatemala, and Venezuela	[216,281,444,541]
Uromyces guayacuru Speg.	*Statice brasiliensis*	Buenos Aires	[542]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces gueldenstaedtiae Liou & Y.C. Wang	*Populus* sp.	China	[543]
Uromyces guerkeanus Henn.	*Lotus* spp. and *Tetragonolobus biflorus*	Belarus, Egypt, France, Greece, Italy, Iraq, Malta, Morocco, Palestine, Portugal, Spain, Syria, Tunisia, and Yugoslavia	[196,220,422,426,544]
Uromyces guraniae Mayor	*Gurania* sp.	Brazil and Colombia	[127,212,226]
Uromyces gypsophilae Cooke	*Gypsophila* sp.	Asia, Europe, Turkey, Iran, and Iraq	[80,82,165,196,317,346,545–547]
Uromyces habrochloae Gjaerum	*Habrochloa bullockii*	Malawi	[244]
Uromyces hainanicus J.Y. Zhuang & S.X. Wei	*Ipomoea sumatrana*	China	[319]
Uromyces halimodendri Solkina	*Halimodendron argenteum* and *H. halodendron*	China and Uzbekistan	[198,220]
Uromyces handelii Bubák	*Lotus gebelia*	Iraq	[220,548]
Uromyces haraeanus Syd. & P. Syd.	*Scirpus* spp.	China, Japan, and Russia	[90,92,297,549]
Uromyces hardenbergiae McAlpine	*Hardenbergia monophylla*	Australia	[280]
Uromyces hariotianus Lagerh.	*Odontonema callistachyum*, *Pseuderanthemum cuspidatum*, *Pseuderanthemum* sp., and*Thyrsacanthus strictus*	Costa Rica and México	[218,281,550]
Uromyces harmsianus (Henn.) Doidge	*Crotalaria* spp.	India, Kenya, Malawi, Rwanda, South Africa, Tanzania, and Uganda	[138,168,171,172,551]
Uromyces haussknechtii Tranzschel	*Euphorbia thamnoide* and *E. pilosa*	India and Syria	[157,350]
Uromyces hawksworthii É.S.C. Souza, Z.M. Chaves, W.R.O. Soares, Pinho & Dianese	*Phthirusa stelis*	Brazil	[60]
Uromyces hedysari-obscuri (DC.) Carestia & Picc.	*Hedysarum* spp.	Alaska, Austria, Canada, Czech Republic, China, Germany, France, Finland, Hungary, India, Italy, Kazakhstan, Mongolia, Romania, Russia, Switzerland, and Tajikistan	[94,96,220,357,436,535,552,553]
Uromyces hedysari-paniculati (Schwein.) Farl.	*Desmodium* spp. and *Meibomia* spp.	America, Argentina, Bolivia, Brazil, Canada, Colombia, Costa Rica, Cuba, Indiana, Jamaica, Massachusetts, México, Trinidad and Tobago, Venezuela, West Indies, and Vermont	[87,88,171,172,185,191,310,415]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces heimerlianus Magnus	*Ervum* spp., *Euphorbia* spp., *Lathyrus* spp., and *Vicia* spp.	Armenia, Austria, Belarus, Bulgaria, China, Czech Republic, France, Germany, Hungary, Italy, Japan, Portugal, Romania, Russia, Serbia, Spain, Switzerland, Ukraine, and Yugoslavia	[220,519,554]
Uromyces heimii Mayor & Vienn. Bourg.	*Medicago arborea*	France	[516]
Uromyces helichrysi Lagerh.	*Helichrysum plicatum*, *Helichrysum rupestre*, and *Helichrysum siculum*	Algeria, Greece, and Turkey	[80,421,435]
Uromyces heliotropii Sred.	*Heliotropium* spp.	Australia, Bulgaria, Cyprus, Greece, Israel, Pakistan, Ukraine, and Uzbekistan	[80,81,111,145,393,421,555,556]
Uromyces hellebori-thibetani J.Y. Zhuang & S.X. Wei	*Helleborus thibetanus*	China	[195]
Uromyces hemmendorfii Vestergr.	*Bauhinia forficata*	São Paulo	[219]
Uromyces hermonis Magnus	*Euphorbia herniariifolia* and *E. peplus*	Greece and Iraq	[196,345,421]
Uromyces herterianus Dietel	*Borreria verticillata*, *Diodia* sp. and *Spermacoce verticillata*	Argentina, French Guiana, and Uruguay	[395,415,557]
Uromyces hessii Berndt	*Zantedeschia angustiloba*	Angola	[558]
Uromyces heterantherae (Henn.) P. Syd. & Syd.	*Heteranthera reniformis*	Brazil	[102,144]
Uromyces heterodermus Syd. & P. Syd.	*Erythronium* spp.	Alberta, California, Canada, Columbia, Colorado, Idaho, Montana, Oregon, Texas, Utah, and Washington (USA)	[79,185,187,559]
Uromyces heterogeneus Cooke	*Hibiscus syriacus*	India	[126,560]
Uromyces heteromallus Syd.	*Haloxylon recurvum*	Pakistan	[208,356,561–563]
Uromyces heteromorphae Thüm.	*Heteromorpha* spp. and *Peucedanum* spp.	Eritrea, Malawi, and South Africa	[138,273,287,564]
Uromyces hewittiae Syd. & P. Syd.	*Hewittia bicolor* and *Hewittia* sp.	Philippines	[565]
Uromyces hidakaensis Muray. & Takeuchi	*Pisum sativum*	Japan	[222,566]
Uromyces himalaicus Y. Ono, Adhikari & Rajbh.	*Lilium* sp.	Nepal	[567]
Uromyces hippocrepidis Syd. & P. Syd.	*Hippocrepis ciliate* and *H. comosa*	Greece, France, Spain, and Switzerland	[220,421,568]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces hippomarathri Lindr.	*Hippomarathrum crispum*, *H. libanotis*, and *H. microcarpum*	Iran and Morocco	[279,317,569]
Uromyces hippomarathricola Sousa da Câmara	*Hippomarathrum pterochlaenum*	Portugal	[570]
Uromyces hobsonii Vize	*Jasminum* spp.	Euthopia, India, Kenya, and Sri Lanka	[140,571,572]
Uromyces holci Jørst.	*Holcus setiger*, *Karroochloa* sp., *Schismus barbatus*, *S. scaberrimus*, and *Tribolium echinatum*	Namibia and South Africa	[124,378]
Uromyces holubii Doidge	*Dracaena* sp.	Gauteng	[573]
Uromyces holwayi Lagerh.	*Chlorophytum* sp. and *Lilium* spp.	China, California, Canada, Idaho, Iowa, Japan, New York, Nebraska, New Jersey, Oregon, Pakistan, and Washington (USA)	[94,96,187,412,559]
Uromyces hordeastri A.L. Guyot	*Bellevalia flexuosa*, *Hordeum* spp., and *Muscari parviflorum*	France and Israel	[81,126]
Uromyces houstoniatus J. Sheld.	*Houstonia* spp. and *Sisyrinchium* spp.	Connecticut, Illinois, Kansas, Massachusetts, Missouri, Mississippi, New York, Pennsylvania, Vermont, and Wisconsin (USA)	[191,251]
Uromyces howei (Peck) De Toni	*Asclepias curassavica*, *A. guatemalensis*, and *A. nivea*	Bermuda, Cuba, Guatemala, Jamaica, and Peru	[260,281,308,574]
Uromyces huallagensis Henn.	*Desmodium* sp.	Peru	[575]
Uromyces hyacinthi W. Schneid.	*Hyacinthus fastigiatus*	Canada	[115]
Uromyces hyalinus Peck	*Sophora nuttalliana*, *S. sericea*, and *S. stenophylla*	Arizona, Colorado, México, and Wyoming	[116,225,292,559,576]
Uromyces hybridi W.H. Davis	*Trifolium hybridum*	Connecticut, India, Massachusetts, Maine, and Vermont	[191,577,578]
Uromyces hyderabadensis Ramachar, K.N. Rao & Bagyan.	*Atylosia scarabaeoides*	India	[579]
Uromyces hydrocotylicola J.Y. Zhuang	*Hydrocotyle* sp.	China	[96,580]
Uromyces hymenocarpi Jaap	*Hymenocarpos circinnatus*	Croatia, Greece, Israel, and Turkey	[80,81,421,581]
Uromyces hyparrheniae Gjaerum	*Hyparrhenia* spp.	Angola, Cameroon, Ethiopia, and Uganda	[243,244]
Uromyces hyparrheniicola Gjaerum	*Hyparrhenia dregeana*	South Africa	[243]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces hyperici (Schwein.) M.A. Curtis	*Ascyrum hypericoides*, *Elodea* sp., and *Hypericum* spp.	China, California, Florida, Georgia, Indiana, Iowa, Japan, Massachusetts, Mississippi, Missouri, Maine, New York, Texas, Uganda, Vermont, and Wisconsin (USA)	[89,90,186,202,251,262,582,583]
Uromyces hyperici-frondosi (Schwein.) Arthur	*Hypericum* spp. and *Triadenum virginicum*	Brazil, Chile, California, Colombia, Guatemala, Maine, Massachusetts, Pennsylvania, South Africa, and Vermont	[78,101,118,119,138,191,281,520,584]
Uromyces hypericinus Speg.	*Hypericum brasiliense*	Formosa	[180]
Uromyces hypoestis Tarr & G.F. Laundon	*Hypoestes verticillaris*	South Africa, Sudan, Tanzania, and Zimbabwe	[218,250,274]
Uromyces hypsophilus Speg.	*Euphorbia* sp.	Mendoza	[391]
Uromyces ictericus Cummins	*Iresine celosia* and *Iresine* sp.	Costa Rica and Guatemala	[167,233,310]
Uromyces ignobilis (Syd. & P. Syd.) Arthur	*Muhlenbergia* sp. and *Sporobolus* spp.	Barbados, Cuba, Dominica, Grenada, Guyana, Indonesia, Hawaii, México, Pakistan, Texas, and Venezuela	[76,122,171,172,306,309,356,430,431,445,456,559,585,586]
Uromyces illotus Arthur & Holw.	*Mucuna andreana*, *M. rubro-aurantiacea*, *M. sloanei*, and *M. urens*	The Dominican Republic, Ethiopia, and Guatemala	[281,406,571]
Uromyces imperfectus Arthur	*Bauhinia* spp.	Jamaica, Nicaragua, and Venezuela	[225,308,444,586]
Uromyces inaequialtus Lasch	*Cerastium* sp., *Melandrium* sp., and *Silene* sp.	Argentina, Bulgaria, Canada, Chile, China, Finland, Greece, Japan, Nepal, Norway, Romania, Taiwan, South Africa, Sweden, and Ukraine	[82,91,92,97,111,128,135,142,185,188,240,415,421,587]
Uromyces inayatii Syd. & P. Syd.	*Apluda aristata* and *A. mutica*	India and Papua New Guinea	[85,426]
Uromyces indicus Pat.	*Sporobolus indicus*	Barbados	[588,589]
Uromyces indigoferae Dietel & Holw.	*Indigofera* spp.	Argentina, Arizona, Costa Rica, China, Guatemala, Florida, India, México, Panama, Texas, and Venezuela	[90,116,171,172,262,281,292,357,375,415,425,492,559,590]
Uromyces induratus Syd., P. Syd. & Holw.	*Dicliptera* spp., *Jacobinia* sp., and *Justicia racemosa*	Argentina, Bolivia, Brazil, Costa Rica, and México	[102,218,292,310,333]
Uromyces infarctus Berndt	*Cayaponia* sp.	Costa Rica	[127]
Uromyces inflatus (Cooke) McKenzie	*Anisotome* sp.	New Zealand	[591]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces ingicola Henn.	*Inga* sp.	Amazonas	[575]
Uromyces ingiphilus Speg.	*Inga edulis*	Argentina	[592]
Uromyces insignis P. Syd. & Syd.	*Echinocephalum latifolium* and *Melanthera latifolia*	Brazil	[102,219]
Uromyces insularis Arthur	*Clitoria cajanifolia*	Puerto Rico	[466]
Uromyces intricatus Cooke	*Chorizanthe* sp., *Eriogonum* spp., and *Gayophytum ramosissimum*	Arizona, Canada, California, Idaho, Oregon, Montana, and Washington (USA)	[185,187,300,412,448]
Uromyces invisus (Speg.) Speg.	*Solanum sisymbriifolium*	Argentina	[415,592]
Uromyces ipatingae F.A. Ferreira & Y. Hirats.	*Clitoria fairchildiana*	Brazil	[219,593]
Uromyces iresines Lagerh.	*Iresine* spp.	Argentina, Colombia, Dominican Republic, Ecuador, Guatemala	[118,119,144,167,281]
Uromyces isachnes Petch	*Isathne kunthiana*	Sri Lanka	[594]
Uromyces itoanus Hirats. f.	*Kummerowia* stipulacea, *K. striata*, and *Microlespedeza* spp.	China, Korea, Japan, and Taiwan	[89,90,483,595,596]
Uromyces ixiae (Lév.) G. Winter	*Acidanthera* spp., *Antholyzasp.*, *Babiana* spp., *Engysiphon* sp., *Geissorhiza* sp., *Gladiolus* spp., *Hesperantha* spp., *Ixia* spp., *Lapeirousia* spp., *Melasphaerula* spp., *Romulea* sp., and *Sparaxis* spp.	Kenya and South Africa	[123,140]
Uromyces jacksonii Arthur & Fromme	*Agrostis* spp., *Deschampsia* spp., *Festuca* spp., and *Hordeum* spp.	California, Idaho, Oregon, Michigan, and Washington (USA)	[241,559]
Uromyces jamaicensis Vestergr.	*Bauhinia* spp.	Cuba, El Salvador, Jamaica, México, Puerto Rico, and Venezuela	[184,216,292,306,308,444,541]
Uromyces janiphae (G. Winter) Arthur	*Jatropha* spp. and *Manihot* sp.	Brazil, Colombia, Costa Rica, Cuba, Ecuador, Panama, Puerto Rico, México, and Venezuela	[76,118,119,125,431,456,511,597]
Uromyces japonicus Berk. & M.A. Curtis	*Orchidaceae*	Bulgaria, China, Italy, Japan, Poland, Russia, and Ukraine	[51,82,96,135,160,598,599]
Uromyces jatrophae Dietel & Holw.	*Jatropha multifida*	Brazil, Colombia, Cuba, México, Jamaica, Puerto Rico, and Virgin Islands	[102,103,184,227,308,479,597]
Uromyces jatrophicola Henn.	*Cnidoscolus* sp. and *Jatropha* sp.	Brazil	[103,600]
Uromyces joffrinii Delacr.	*Vanilla planifolia*	France	[476]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces johowii Dietel & Neger	*Vicia macraei*, *V. nigricans*, and *Vicia* sp.	Chile	[282,494]
Uromyces jonesii Peck	*Ranunculus* sp.	California, Colorado, Montana, and Wyoming	[187,300,368,412,601]
Uromyces jordianus Bubák	*Euphorbia cyparissias*	Austria, Bulgaria, Czech Republic, Germany, Hungary, Romania, Russia, Switzerland, and Ukraine	[82,220,602]
Uromyces junci Tul.	*Ambrosia psilostachya*, *Arnica* spp., *Aster* spp., *Bahia dissecta*, *Cirsium* spp., *Eriophyllum* sp., *Grindelia* sp., *Helianthus* spp., *Jaumea* spp., *Juncus* spp., *Juniperus litoralis*, *Luzula alopecurus*, and *Pulicaria dysenterica*	Arizona, Bolivia, Bulgaria, Canada, California, Chile, Colorado, Florida, Germany, Idaho, Israel, Japan, North and South Dakota, Nebraska, Montana, Oklahoma, Oregon, Pennsylvania, Poland, Romania, Spain, Wyoming, and Wisconsin (USA)	[81,82,105,116,135,185,187,262,377,386,559,603]
Uromyces juncicola Speg.	*Juncus stipulatus*	Mendoza	[180]
Uromyces junci-effusi P. Syd. & Syd.	*Juncus* spp.	Arizona, California, Canada, Idaho, Florida, Georgia, Maine, Missouri, Montana, Oregon, Utah, Washington, and Wyoming	[114,116,144,185,187,191,202,262,559]
Uromyces juncinus Thüm.	*Junco acutiflori*	Italy	[604]
Uromyces kaernbachii Henn.	*Abrus precatorius*	Papua New Guinea	[136]
Uromyces kaimontanus Hirats. f. & S. Sato	*Veratrum album*, *V. grandiflorum*, *V. nigrum*, and *V. puberulum*	China, Japan	[222,605]
Uromyces kalmusii Sacc.	*Euphorbia* sp.	China, Germany, Poland, and Russia	[105,135,606,607]
Uromyces karjaginii Uljan.	*Seseli cuneifolium*	Azerbaijan	[608]
Uromyces kawakamii Syd. & P. Syd.	*Euphorbia serrulata*	China, Japan, and Taiwan	[94,97,108,446]
Uromyces kentaniensis Doidge	*Antholyza aethiopica* and *Chasmanthe aethiopica*	South Africa	[249,322]
Uromyces kenyensis J.F. Hennen	*Chloris gayana*, *C. myriostachya*, and *C. roxburghiana*	Kenya, Uganda, Zimbabwe	[171,242,460]
Uromyces kigesianus Cummins	*Pittosporum abyssinicum*	Uganda	[609]
Uromyces kisantuensis Henn.	*Dolichos* sp.	The Democratic Republic of the Congo	[610]
Uromyces klebahnii E. Fisch.	*Astragalus* spp. and *Oxytropis* sp.	Austria, Bulgaria, France, Italy, Romania, Russia, Switzerland, and Turkey	[80,82,220]
Uromyces klotzschianus B. Ali	*Rumex dentatus*	Pakistan	[61]
Uromyces kochiae Syd. & P. Syd.	*Kochia prostrata*	China, Russia, Turkey, and Uzbekistan	[144,146,198,402]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces kochianus Gäum.	*Geranium nodosum*	Switzerland	[611]
Uromyces koeleriae Uljan.	*Koeleria caucasica*	Russia	[106]
Uromyces komarowii Bubák	*Solidaginis virgaureae*	Czech Republic	[612]
Uromyces kondoi Miura	*Amblytropis multiflora*	China, Japan, and Pakistan	[89,156,356]
Uromyces krameriae Arthur	*Krameria* spp.	Florida and Texas	[262,281]
Uromyces krantzbergensis Doidge	*Anthericum* sp.	Namibia	[138]
Uromyces kunigamiensis Shimab.	*Fimbristylis dichotoma* and *Fimbristylis* sp.	China and Japan	[108,222]
Uromyces kurtzii Henn.	*Senecio* spp.	Argentina	[415,613]
Uromyces kwangensis Henn.	*Justicia* sp.	Congo	[218,610]
Uromyces kwangsianus Cummins	*Fimbristylis* sp.	China and Taiwan	[614,615]
Uromyces lachenaliae Doidge	*Lachenalia* spp. and *Polyxena ensifolia*	South Africa	[123,138]
Uromyces laevigatus Syd. & P. Syd.	*Aneilema* spp.	Ghana and Tanzania	[318,549,616]
Uromyces laevis Körn.	*Euphorbia* spp.	Bulgaria, Germany, Iran, Romania, Turkey, and Ukraine	[80,82,105,111,228,617,618]
Uromyces langtangensis Durrieu	*Anaphalis nepalensis*	Nepal	[463]
Uromyces lapeyrousiae Petr.	*Lapeyrousia*	Tanzania	[231]
Uromyces lapponicus Lagerh.	*Astragalus* spp. and *Oxytropis* spp.	Alaska, Canada, China, Colorado, Finland, Idaho, India, Iran, Japan, Mongolia, Norway, Oregon, Pakistan, Russia, Sweden, and Turkey	[80,96,128–131,357,368,436,449,535,619]
Uromyces largus Arthur & Cummins	*Chamaesyce lata*	Colorado	[87,88]
Uromyces laserpitii-graminis E. Fisch.	*Laserpitii sileris* and *Melica ciliata*	Southern Europe and Northern Africa	[106]
Uromyces lasiocorydis Henn.	*Lasiocorys abyssinica*	Eritrea	[287,426]
Uromyces lathyrinus Speg.	*Lathyrus* spp. and *Vicia* spp.	Argentina, Brazil, Chile, and Paraguay	[100–102,219,620]
Uromyces latimammatus J.Y. Zhuang & S.X. Wei	*Ipomoea sumatrana*	China	[621]
Uromyces lazistanicus Petr.	*Orobus roseus*	Armenia and Turkey	[220]
Uromyces lenticola Petr.	*Lens esculenta*	Iran	[430]
Uromyces leonotidis Bagyan., Gjaerum & M. Raju	*Leonotis nepetifolia*	India	[622]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces leptaleus Syd.	*Stellaria laxa*	China, Japan, Philippines, and Taiwan	[89,90,97,565,623]
Uromyces leptochloae Wakef.	*Leptochloa obtusiflora*	Kenya and Uganda	[140,168]
Uromyces lereddei Dupias	*Colutea arborescens*	France	[220,624]
Uromyces lespedezae (Thüm.) Peck	*Lespedeza capitata*	Vermont	[583]
Uromyces lespedezae-bicoloris F.L. Tai & C.C. Cheo	*Lespedeza bicolor* and *L. formosa*	China	[108,109,625]
Uromyces lespedezae-macrocarpae Liou & Y.C. Wang	*Campylotropis macrocarpa*, *Lespedeza bicolor*, and *L. formosa*	China	[108,109]
Uromyces lespedezae-procumbentis (Schwein.) Lagerh.	*Campylotropis* spp., *Kummerowia* spp., and *Lespedeza* spp.	Canada, China, Georgia, India, Japan, Korea, Missouri, Taiwan, and Pennsylvania	[94,108,109,185,202,255,357,482,596]
Uromyces lespedezae-sericeae S. Ahmad	*Lespedeza sericea*	Pakistan	[208]
Uromyces libycus Trotter	*Lotus pusillus*	Libya	[197,626]
Uromyces ligulariae Hirats. & Hoshioka	*Ligularia tussilaginea* var. *formosana*	China, Japan, Taiwan	[94,97,109,627]
Uromyces limonii-caroliniani Savile & Conners	*Limonium carolinianum*	Canada, Mississippi, and Texas	[185,559,628]
Uromyces limosellae F. Ludw.	*Limosella* sp.	Australia	[280]
Uromyces loculatus Cummins	*Kyllinga alba*	Zambia	[341]
Uromyces loculiformis T.S. Ramakr. & K. Ramakr.	*Chlorophytum attenuatum*	China, India, and Nepal	[96,464,629]
Uromyces lomandracearum J. Walker & van der Merwe	*Lomandra longifolia* and *Lomandra* sp.	Australia	[62,630]
Uromyces longipedicellaris Ramachar & A. Sudh. Rao	*Rumex vesicarius*	Pakistan	[631]
Uromyces longipes (Lasch) Tranzschel	*Pedicularis* sp.	Russia	[382]
Uromyces loranthi H.S. Jacks.	*Loranthus*	Brazil	[376]
Uromyces lotononidicola Berndt	*Lotononis cytisoides*	South Africa	[632]
Uromyces lugubris Kalchbr.	*Euphorbia cyparissias*	South Africa	[137]
Uromyces lupini Berk. & M.A. Curtis	*Lupinus* spp.	Arizona, California, Canada, Colorado, México, Montana, Oregon, Washington, and Wyoming	[116,185,187,368,412,454,598]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces lupinicola Bubák	*Lupinus* spp.	Bulgaria, Finland, Lithuania, Norway, and Spain	[158,363,587,612]
Uromyces lychnidis Tracy & Earle	*Lychnidis drummondii*	Utah	[633]
Uromyces lygei P. Syd. & Syd.	*Lygeum spartum*	Sardegna	[325]
Uromyces macnabbii Cummins	*Chionochloa* spp. and *Danthonia* spp.	New Zealand	[284,591]
Uromyces macounianus Ellis & Everh.	*Euphorbia maculata* var. *affinis* and *E. serpyllifolia*	Canada and British Columbia	[103,388,634]
Uromyces macowanii Bubák	*Scilla prasina*	Africa	[612]
Uromyces magnatus (Arthur) Arthur	*Polygonatum* sp. and *Vagnera* sp.	Illinois, Iowa, Minnesota, Montana, Nebraska, North and South Dakota, and Wisconsin	[306,307]
Uromyces magnusii Kleb.	*Medicago minima*	China, Turkey, and Ukraine	[80,96]
Uromyces maireanus P. Syd. & Syd.	*Ornithogalum* spp.	Morocco, South Africa, Tanzania	[142,144,318]
Uromyces major Arthur	*Muhlenbergia reverchonii*, *Muhlenbergia* sp., and *Sporobolus indicus*	Belize, México, Texas, Trinidad, and Tobago	[112,117,635]
Uromyces malloti Henn.	*Mallotus moluccanus* and *Melanolepismulti glandulosa*	Guinea, New Papua, and the Philippines	[136,177]
Uromyces mangenotii Mayor & Vienn. Bourg.	*Vicia pubescens*	France	[516]
Uromyces manihoticola Henn.	*Manihot* spp.	Brazil	[102,103,291]
Uromyces manihotis Henn.	*Manihot* spp.	Brazil, Colombia, Cuba	[102,227,291]
Uromyces manihotis-catingae Henn.	*Manihot* spp.	Brazil	[102,600]
Uromyces marinus Guyot & Malençon	*Medicago marina*	Morocco	[220,279]
Uromyces martinii Farl.	*Melanthera* spp., *Bidens* spp.	Florida	[225,262,636]
Uromyces massoniae Doidge	*Massonia latifolia*	South Africa	[138]
Uromyces mayorii Tranzschel	*Euphorbia* spp.	California and Colombia	[227,412]
Uromyces mbelensis Henn.	*Indigofera*	The Democratic Republic of the Congo	[610]
Uromyces megalosporus Speg.	*Tessaria absinthioides*	Tucumán	[371]
Uromyces meimerlianus Magnus	*Vicia* sp.	Germany	[531]
Uromyces melandrii Dietel & Neger	*Melandrium cucubaloides*	Los Lagos	[162]
Uromyces melantherae Cooke	*Melanthera brownii*	Ghana, South Africa, and Uganda	[138,168,616]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces melasphaerulae Syd. & P. Syd.	*Melasphaerula graminea*	Western Cape Province	[424]
Uromyces melothriae Henn.	*Melothria tomentosa*	Eritrea	[287,427]
Uromyces menyanthis Azbukina & Zenkova	*Menyanthes trifoliata*	Primorye	1966 [637]
Uromyces mercurialis Henn.	*Mercurialis leiocarpa*	China, Japan, and Taiwan	[94,96,97]
Uromyces mexicanus Dietel & Holw.	*Desmodium*	Arizona, Costa Rica, México	[116,171,310,479]
Uromyces meygounensis Petr.	*Euphorbia bungei*	Iran	[638]
Uromyces microchloae Syd. & P. Syd.	*Microchloa setacea*	Bolivia, Brazil, Central Africa, Sudan, and Uganda	[106,168,199,394]
Uromyces microsorus Kalchbr. & Cooke	*Prunus armeniaca*	South Africa	[137]
Uromyces microtidis Cooke	*Microtis porrifolia*	Australia and New Zealand	[245,313,639]
Uromyces miersiae Gäum.	*Miersia chilensis*	Chile	[540]
Uromyces mikaniae Viégas	*Mikania* sp.	Brazil	[219,640]
Uromyces mimusops Cooke	*Mimusops* sp.	South Africa	[641]
Uromyces minimus Davis	*Muhlenbergia sylvatica*	Canada, Michigan, Oregon, and Wisconsin	[185,635]
Uromyces minor J. Schröt.	*Medicago denticulata*, *Pisum sativum*, and *Trifolium* spp.	Armenia, Austria, Bulgaria, California, Caucasus, Chile, China, Czech Republic, Estonia, Finland, France, Germany, Hungary, India, Montana, Pakistan, Poland, Romania, Russia, Spain, Sweden, Switzerland, Texas, Ukraine, New Zealand, Oregon, Washington, and Wyoming	[220,313,355,357,559,642]
Uromyces minutus Dietel	*Carex* spp.	Alabama, Central and Eastern United States, Iowa, Mississippi, Texas, and Wisconsin	[255,475,559,643,644]
Uromyces miurae Syd. & P. Syd.	*Fritillaria kamtschatcensis*	Alaska, Canada, Idaho, Japan, Russia, and Washington (USA)	[94,185,187,645,646]
Uromyces moehringiae S. Ito & Hirats. f.	*Moehringia lateriflora*	Japan	[94,297]
Uromyces moesiacus Lindtner & Vienn. Bourg.	*Lathyrus nissolia*	Yugoslavia	[451]
Uromyces mogianensis Bubák	*Fritillaria graeca*, *F. rhodocanakis*, *Rhinopetalum arianum*, *R. gibbosum*, and *R. karelinii*	Afghanistan, Greece, and Uzbekistan	[421,555,612]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces mongolicus U. Braun & G. Hirsch	*Euphorbia kozlovii*	Mongolia	[535,647]
Uromyces monspessulanus Tranzschel	*Euphorbia serrata*	Balearic Islands, Libya, and Spain	[129,157,197,648]
Uromyces montanoae Arthur & Holw.	*Montanoa dumicola*, *M. pittieris*, *M. hibiscifolia*, and *Montanoa* sp.	Costa Rica and Guatemala	[225,281,310]
Uromyces montanus Arthur	*Lupinus mexicanus*	Guatemala and México	[281,398]
Uromyces montis-ferrati Maire	*Euphorbia luteola*	Northern Africa	[649]
Uromyces moraeae Syd. & P. Syd.	*Moraea spathacea*	South Africa	[138,144]
Uromyces mucunae Rabenh.	*Mucuna pruriens*	China, Cambodia, Japan, India, Indonesia, Madagascar, Malawi, Mauritius, Taiwan, Tanzania, South Africa, Guinea, Philippines, Thailand, and Uganda	[97,209,273,309,465,565,605,650–652]
Uromyces muhlenbergiae S. Ito	*Muhlenbergia japonica*	Japan	[635]
Uromyces mulgedii Lindr.	*Lactuca* sp.	The Czech Republic and Turkey	[569]
Uromyces mulini J. Schröt.	*Mulinum integrifolium*	Argentina and Chile	[240,331,415]
Uromyces musae Henn.	*Musa* spp.	Congo, Fiji, and Philippines	[565,610,653,654]
Uromyces muscari (Duby) Niess	*Bellevalia* spp., *Chionodoxa* spp., *Dipcadi erythraeum*, *Endymionspp*., *Gagea* sp., *Hyacinthoides* spp., *Leopoldia* spp., *Muscari* spp., *Ornithogalum* sp., *Scilla* spp., and *Urginea* spp.	Afghanistan, Bulgaria, California, Canada, Germany, Greece, India, Israel, Iran, Italy, Morocco, New Zealand, Norway, Scotland, Sweden, and Turkey	[80–82,105,123,124,179,317,318,389,534,655]
Uromyces mussooriensis Syd. & P. Syd.	*Stipa sibirica*	India	[106,656]
Uromyces myosotidis Bahç.	*Myosotis* sp.	Turkey	[471]
Uromyces myristica Berk. & M.A. Curtis	*Euphorbia bicolor*	Texas	[657]
Uromyces myrsines Dietel	*Ardisia compressa*, *Icacorea* sp., *Myrsine* spp., and *Rapanea* spp.	Bolivia, Brazil, Costa Rica, and Uruguay	[100,101,143,310]
Uromyces mysticus Arthur	*Hordeum jubatum*	California, Canada, Colorado, Idaho, Israel, and Utah	[81,112,114,185,412,559]
Uromyces namaqualandus Mennicken, W. Maier & Oberw.	*Roepera cordifolia*	Namibia	[384]
Uromyces nassauviae J.C. Lindq.	*Nassauvia lagascae*	Argentina	[415]
Uromyces nassellae Cummins	*Nassella pubiflora*	Bolivia	[106]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces natalensis Magnus	*Euphorbia* spp.	Madagascar and South Africa	[169,465]
Uromyces natricis A.L. Guyot	*Ononis rotundifolia*	France	[342]
Uromyces nattrassii Cummins	*Statice spicata*	Cyprus	[350]
Uromyces naucinus Berndt	*Cayaponia* sp.	Ecuador	[127]
Uromyces necopinus Cummins	*Hypoxis hirsuta*	Connecticut, Massachusetts, and New York	[167,233]
Uromyces neotropicalis J.R. Hern. & Aime	*Cayaponia rigida*, *C. selysioides*, and *Cucurbita* sp.	Guiana and Guyana	[63,557]
Uromyces nevadensis Harkn.	*Primula suffrutescens*	California	[78,658]
Uromyces nidificans Tranzschel	*Aellenia subaphylla*, *Cimacoptera korshinskyi*, *Salsola arbuscula*, and *Salsola* sp.	Central Asia, Iran, and Uzbekistan	[146,161,346]
Uromyces niteroyensis Rangel	*Panicum* spp. and *Setaria* spp.	Argentina, Brazil, Colombia, India, French Guiana, and México	[102,110,395,415,659]
Uromyces nordenskjoldii Dietel	*Vicia darapskyana* and *Vicia* sp.	Argentina and Chile	[415]
Uromyces notabilis Wakef.	*Cyperus* sp. and *Kyllinga* sp.	Uganda	[168,462]
Uromyces nothoscordi Syd. & P. Syd.	*Nothoscordum striatum*	Texas	[660]
Uromyces novissimus Speg.	*Trianosperma ficifolia*	Argentina, Brazil, Colombia, Panama, México, and West Indies	[48,324,469]
Uromyces numidicus Maire	*Geranium atlanticum*	Northern Africa	[649]
Uromyces nyikensis Syd. & P. Syd.	*Gladiolus nyikensis*	Malawi	[424]
Uromyces nymphoidis Săvul.	*Nymphoides peltata*	Romania	[228]
Uromyces oaxacanus Dietel & Holw.	*Jatropha urens*	Arizona, Belize, Guatemala, and México	[103,116,281]
*Uromyces oberwinklerianus*Berndt	*Acalypha* sp.	Costa Rica	[310]
Uromyces obesus Durrieu	*Heteropogon contortus*	Nepal and Uganda	[244,464]
Uromyces oblectaneus H.S. Jacks. & Holw.	*Rhynchospora corymbosa*, *R. exaltata*, and *Rhynchospora* sp.	Brazil	[166,219]
Uromyces oblongisporus Ellis & Everh.	*Artemisia tridentata*	China and Wyoming	[225,661]
Uromyces oblongus Vize	*Medicago polymorpha* and *Trifolium* spp.	California and Washington	[78,454,662]
Uromyces obscurus Dietel & Holw.	*Phaseolus* sp.	México	[456,479]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces occidentalis Dietel	*Euphorbia* spp., *Lupinus* spp., and *Tithymalus* spp.	Arizona, California, Colorado, México, Montana, Nevada, Nigeria, Oregon, and Utah	[114,116,187,292,316,412,663]
Uromyces occultus J.C. Lindq.	*Juncus densiflorus* var. *pohlii*	Argentina, Brazil, Chile, and México	[102,486,664]
Uromyces ocimi Hansf.	*Ocimum menthifolium*	Uganda	[168]
Uromyces oedipus Dietel	*Sophora japonica*	Japan	[665]
Uromyces oenotherae Burrill	*Oenothera linifolia*	Illinois	[582]
Uromyces oliveirae J. Anikster & I. Wahl	*Bellevalia eigii*	Israel	[390]
Uromyces ononidis Pass.	*Euphorbia* spp. and *Ononis* spp.	Bulgaria, Cyprus, Greece, Israel, Italy, Libya, Poland, Morocco, Romania, Spain, and Turkey	[80–82,105,111,220,532,666,667]
Uromyces ophiorrhizae Gäum.	*Ophiorrhiza longiflora*	Indonesia	[309]
Uromyces orbicularis Dietel	*Desmodium* spp.	Argentina, Brazil, and Bolivia	[143,171,269]
Uromyces orchidearum Cooke & Massee	*Chiloglottis* spp.	Australia	[268]
Uromyces orientalis Syd. & P. Syd.	*Indigofera* spp.	Australia, Ethiopia, Ghana, India, Japan, Kenya, Pakistan, Malawi, Philippines, Tanzania, Uganda, and Zambia	[85,168,171,172,357]
Uromyces ornatipes Arthur	*Phrygilanthus sonorae*	México	[15,76,77]
Uromyces ornithogali (Wallr.) Niessl	*Gagea arvensis*, *Ornithopus nanum*, and *Ornithopus* sp.	Romania, Portugal, Spain, and Ukraine	[111,158,179,228]
Uromyces ornithopodioides Gonz. Frag	*Ornithopus isthmocarpus* and *O. compressus*	Portugal	[317]
Uromyces orobi-tuberosi (Pers.) Liro	*Gladiolus* sp.	Finland	[668]
Uromyces orthosiphonis T.S. Ramakr. & Sriniv.	*Orthosiphon glabratus*	India	[152,669]
Uromyces otakou G. Cunn.	*Poa* spp.	New Zealand	[591,670]
Uromyces otaviensis Mennicken, W. Maier & Oberw.	*Ipomoea verbascoidea*	Namibia	[385]
Uromyces ovalis Dietel	*Leersia oryzoides*	Japan	[671]
Uromyces ovirensis Jaap	*Primula wulfeniana*	Austria	[672]
Uromyces pachyceps Lagerh.	*Ipomoea* sp.	Brazil, Ecuador	[126]
Uromyces pallidus Niessl	*Chamaecytisus* spp., *Cytisus* spp., and *Lembotropis nigricans*	Austria, Belarus, Bulgaria, Czech Republic, Germany, Hungary, Italy, Poland, Romania, Ukraine, and Yugoslavia	[105,135,220,673]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces panici-sanguinalis Rangel	*Digitaria horizontalis*, *Panicum sanguinale*, and *Panicum* sp.	Brazil, Cuba, Grenada, and Venezuela	[171,674,675]
Uromyces pannosus Vestergr.	*Bauhinia candicans*	Brazil	[216]
Uromyces papillatus Kalchbr. & Cooke	*Heteromorpha arborescens*	South Africa	[137]
Uromyces paradoxus Syd. & P. Syd.	*Commiphora zimmermannii* and *Commiphora* sp.	Kenya and Mozambique	[138,140,676]
Uromyces parilis Syd.	*Rumex occultans*	Israel	[81]
Uromyces paspalicola Arthur & Holw.	*Paspalum racemosum*	Ecuador	[199,294]
Uromyces paulshoekensis Mennicken, W. Maier & Oberw.	*Roepera foetida*	South Africa and Northern Cape Province	[384]
Uromyces pavgii R.N. Goswami & Ngachan	*Achyranthes aspera*	India	[677]
Uromyces pavoniae Arthur	*Pavonia racemosa*	Puerto Rico	[259,678]
Uromyces pazschkeanus Henn.	*Vigna* sp.	Eritrea	[287,427]
Uromyces peckianus Farl.	*Aristida* spp., *Atriplex* spp., *Bryzopyrum* sp., *Chenopodium* spp., *Distichlis* spp., *Houstonia* spp., *Plantago* spp., and *Salicornia* spp.	Alabama, California, Canada, Florida, Oklahoma, Massachusetts, Missouri, Montana, New York, Texas, and Wisconsin (USA)	[185,187,262,455,475,559,636]
Uromyces peglerae Pole-Evans	*Digitaria* spp.	Kenya, India, Malavi, Mauritius, New Guinea, Pakistan, Philippines, South Africa, Uganda, and Zimbabwe	[171,172,232,441,447]
Uromyces peireskiae Dietel	*Peireskia grandifolia*, *P. sacharosa*, and *Peireskia* sp.	Argentina and Brazil	[394,415]
Uromyces pencanus (Dietel & Neger) Arthur & Holw.	*Nassella* spp. and *Stipa* spp.	Argentina, Australia, Bovilia, Chile, andNew Zealand	[24,199,415]
Uromyces penniseti S. Ahmad	*Pennisetum lanatum*	Pakistan	[536,679]
Uromyces pentaceae D.K. Agarwal	*Pentace burmanica*	India	[680]
Uromyces pentaschistidis Gjaerum	*Pentaschistis airoides*	South Africa	[243]
Uromyces peracarpae S. Ito & Tochinai	*Peracarpa carnosa* and *P. circaeoides*	Japan and Russia	[94,297]
Uromyces peraffinis Dietel	*Bauhinia* sp.	Brazil	[219]
Uromyces pereskiae H.S. Jacks. & Holw.	*Pereskia aculeata*, *P. grandifolia*, and *Pereskia* sp.	Argentina and Brazil	[269,681]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces perigynius Halst.	*Carex* spp., *Ratibida columnaris*, *Rudbeckia* spp., and *Solidago* spp.	Bermuda, Canada, Idaho, Iowa, Maine, Missouri, Montana, Oregon, Pennsylvania, Washington, and Wisconsin	[185,187,191,252,260]
Uromyces perlebiae Vestergr.	*Bauhinia* spp.	Brazil	[102,216]
Uromyces permeritus Cummins	*Tournefortia sarmentosa* and *Tournefortia* sp.	Papua New Guinea	[223,426]
Uromyces persicus Syd. & P. Syd.	*Astragalus* spp., *Oxytropis* spp., and *Phaca* spp.	Alaska, Alberta, Austria, Canada, Colorado, India, Iran, Japan, Kazakhstan, Norway, Oregon, Russia, Siberia, Sweden, Tajikistan, and Turkmenistan	[220,357,682]
Uromyces petitmenginii Maire	*Minuartia globulosa* and *M.* mereyi	Greece, Turkey	[80,421,470]
Uromyces phacae-frigidae (Wahlenb.) Har.	*Astragalus* spp. and *Phaca* spp.	Alaska, Canada, Caucasus, Kyrgyzstan, Pakistan, Norway, Russia, and Sweden	[367,436,553,646]
Uromyces phalaridicola Katajev	*Phalaris minor*	Turkmenistan	[106]
Uromyces phaseolicola Speg.	*Phaseolus prostratus*	Argentina	[126,180]
Uromyces phlei-michelii Cruchet	*Phleum alpinum*, *P. phleoides*, and *P. michelii*	Morocco and Switzerland	[126,279]
Uromyces phlogacanthi Gäum.	*Phlogacanthus celebicus*	Indonesia	[309,683]
Uromyces phtirusae Mayor	*Phthirusa pyrifolia*	Colombia	[15,226]
Uromyces phyllachoroides Henn.	*Cynosurus elegans*	Tunisia	[684]
Uromyces physanthyllidis Vienn.-Bourg.	*Physanthyllis tetraphylla*	Greece	[544]
Uromyces phyteumatum (DC.) Niessl	*Phyteuma* spp.	The Czech Republic, Denmark, France, Germany, Norway, Poland, Romania, and Spain	[128,158,159,228,440]
Uromyces pianhyensis Henn.	*Wedelia* spp.	Brazil, Ethiopia, India, Puerto Rico, Virgin Islands, and West Indies	[264,312,571,600]
Uromyces pictus Thüm.	*Abutilon elaeocarpoides* and *Abutilon* sp.	Galapagos Islands and Ethiopia	[571,685,686]
Uromyces pieningii Cummins	*Ipomoea argentaurata* and *Ipomoea pes-caprae*	Ghana and Indonesia	[126,341]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces pisi-sativi (Pers.) Liro	*Astragalus* spp., *Colutea* sp., *Cytisus scoparius*, *Euphorbia* sp., *Galega officinalis*, *Genista* spp., *Lathyrus* spp., *Lotus* spp., *Medicago* spp., *Onobrychis* spp., *Pisum* spp., *Trifolium pratense*, *Ulex europaeus*, and *Vicia* sp.	Finland, Germany, Hong Kong, Israel, Libya, Turkey, Serbia, and Uzbekistan	[80,81,329]
Uromyces pittospori Henn.	*Pittosporum abyssinicum*	Eritrea	[287,687]
Uromyces planiusculus (Mont.) Jørst.	*Rumex frutescens*	Tristan da Cunha	[688]
Uromyces plantaginis Vestergr.	*Plantago barbata* and *P. tubulosa*	Argentina	[165,415]
Uromyces plumbarius Peck	*Gaura* spp., *Oenothera* spp., *Onagra biennis*, and *Pachylophus marginatus*	California, Canada, Colorado, Connecticut, Florida, Idaho, Louisiana, Iowa, México, Minnesota, Mississippi, Oregon, Texas, and Utah	[114,155,185,187,262,475,559]
Uromyces poae-alpinae Rytz	*Poa alpina* and *Ranunculus montanus*	Germany and Poland	[135,160]
Uromyces poinsettiae Speg.	*Poinsettia heterophylla*	Argentina	[689]
Uromyces poiretiae Syd.	*Poiretia scandens*	Venezuela	[431,690]
Uromyces polemanniae Kalchbr. & Cooke	*Polemannia* spp.	South Africa	[137,142]
Uromyces poliotelis Syd.	*Anguria* sp., *Gurania* sp., and *Selysia prunifera*	Costa Rica	[127,229]
Uromyces politus (Berk.) McAlpine	*Muehlenbeckia cunninghamii*	Australia	[280,343]
Uromyces polycnemi McAlpine	*Polycnemum pentandrum*	Bulgaria, Britain, Iran, and Ukraine	[82,280,317,422]
Uromyces polygalae Grove	*Polygala* spp.	Mongolia and Uganda	[535,691]
Uromyces polygoni-avicularis (Pers.) G.H. Otth	*Polygonum nepalense*	Nepal	[692,693]
Uromyces polymniae (Henn.) Dietel & Holw.	*Polymnia* spp.	Argentina, Brazil, Colombia, Guatemala, and México	[219,269,281,375]
Uromyces polymorphus Peck & Clinton	*Lathyri* sp.	New York	[694]
Uromyces polytriadicola Arthur & Cummins	*Polytrias amaura*	Philippines	[232]
Uromyces pontederiae W.R. Gerard	*Pontederia cordata*	Argentina, Brazil, Delaware, Florida, Georgia, Missouri, New York, Pennsylvania, Texas, and Virginia	[415,559,695]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces pontederiicola Speg.	*Pontederia sagittata*	Argentina and India	[34,592]
Uromyces poonensis W.D. More & Moniz	*Sesbania aegyptiaca*, *S. grandiflora*, and *S. sesban*	India	[357,696]
Uromyces porcensis Mayor	*Inga ingoides*	Colombia	[226]
Uromyces porosus (Peck) H.S. Jacks.	*Vicia americana* and *V. sparsifolia*	Iowa	[155,295,454]
Uromyces pozoae Dietel & Neger	*Pozoa hydrocotylifolia*	Chile	[240,417]
Uromyces praetextus Vestergr.	*Bauhinia* sp.	Brazil	[216]
Uromyces prangi Har.	*Hippomarathrum cristatum* and *Prangos* sp.	Bulgaria and Iran	[82,347]
Uromyces pratensis Juel	*Poa pratensis*, *Ranunculus auricomus*, and *R. cassubicus*	Finland	[329]
Uromyces pratiae Speg.	*Hypsela reniformis* and *Pratia repens*	Argentina, Brazil, and Ecuador	[123,219,415]
Uromyces pretoriensis Doidge	*Commelina africana*	Ghana, Uganda, Namibia, and South Africa	[138,168,443]
Uromyces primaverilis Speg.	*Allium striatellum*	Argentina, Illinois, Kansas, Missouri, Michigan, Missouri, Texas, Oklahoma, and Uruguay	[305,415,455,542,559]
Uromyces primulae-integrifoliae (DC.) Niessl	*Primula deorum* and *P. integrifolia*	Bulgaria and Switzerland	[82,159]
Uromyces prismaticus Vienn. Bourg.	*Secale montanum*	Iran	[320]
Uromyces privae Syd. & P. Syd.	*Priva lappulacea*	Cuba and Venezuela	[697,698]
Uromyces probus Arthur	*Olsynium grandiflorum* and *Sisyrinchium* spp.	Canada, California, Idaho, Oregon, Texas, Utah, and Washington	[66,112,185,187,559]
Uromyces procerus J.C. Lindq.	*Festuca procera*	Chile	[240]
Uromyces propinquus P. Syd. & Syd.	*Desmodium* sp. and *Rhopalotria mollis*	Mexico	[325]
Uromyces prosopidis (Jacz.) Jacz.	*Prosopis farcta*	Iran	[699]
Uromyces pseudarthriae Cooke	*Pseudarthria robusta*	South Africa	[700]
Uromyces psoraleae Peck	*Psoralea lanceolata*	Arizona, Canada, Colorado, Idaho, Montana, Oregon, South Africa, Utah, Washington, and Wyoming	[142,185,187,300,368,559,701]
Uromyces psychotriae Henn.	*Psychotria* sp.	Brazil	[219,575]
Uromyces pteroclaenae Lindr.	*Cachryde* sp.	Algeria	[501]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces pulchellus Ellis & Everh.	*Silene douglasii* and *Silene* sp.	California and Washington (USA)	[78,388]
Uromyces pulvinatus Kalchbr. & Cooke	*Euphorbia inaequilatera*	South Africa	[702]
Uromyces punctiformis Syd. & P. Syd.	*Vigna strobiliphora*	Mexico	[703]
Uromyces purpureus Lagerh.	*Liliaceae*	Angola	[704]
Uromyces pustulatus Wakef.	*Bauhinia fassoglensis*	Uganda and Kenya	[140,168]
Uromyces puttemansii Rangel	*Panicum* spp. and *Setaria* spp.	Argentina, Brazil, Cuba, Honduras, Jamaica, México, Panama, Uruguay, and Venezuela	[126,171,674]
Uromyces pyriformis Cooke	*Acorus calamus*	Iowa, Illinois, Japan, Massachusetts, Maine, Minnesota, Mississippi, New York, and Taiwan	[92,155,574,596]
Uromyces quaggafonteinus Mennicken & Oberw.	*Ehrharta calycina*	South Africa	[378,429]
Uromyces quinchamalii Neger	*Quinchamalium* spp.	Argentina, Bolivia, and Chile	[415,705]
Uromyces ramacharii Ravinder & Bagyan.	*Ocimum* sp.	India	[706]
Uromyces ranunculi-distichophylli Semadeni	*Ficaria* sp. and *Ranunculus* sp.	Africa, America, China, Canada, Europe, Iran, Japan, and Russia	[106]
Uromyces rapaneae Henn.	*Rapanea* sp.	São Paulo	[450]
Uromyces ratoides Jørst.	*Cayaponia* spp.	Ecuador	[124,212]
Uromyces ratus H.S. Jacks. & Holw.	*Cayaponia* spp.	Brazil	[210,212]
Uromyces rayssiae J. Anikster & I. Wahl	*Scilla hyacinthoides*	Israel	[390]
Uromyces rebeccae Bruckart, M. Abbasi & Aime	*Suaeda californica*	California	[47]
Uromyces regius Vestergr.	*Bauhinia candicans*	Brazil	[216,219]
Uromyces reichei Dietel	*Milla bivalvis* and *Triteleia gaudichaudiana*	Chile	[240,415]
Uromyces reichertii J. Anikster & I. Wahl	*Scilla hyacinthoides* and *Hordeum bulbosum*	Israel	[81]
Uromyces renovatus P. Syd. & Syd.	*Lupinus* sp.	Czech Republic, Greece, Israel, Kenya, Finland, Portugal, and Spain	[81,131,140,144,158,707]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces reticulatus (Thüm.) Bubák	*Allium victorialis*	Portugal and Spain	[158,612]
Uromyces reynoldsii Thaung	*Modecca bracteata* and *Trichosanthes* spp.	Myanmar	[212]
Uromyces rhinacanthi Cummins	*Rhinacanthus nasutus*	Ghana, West Africa	[218,609]
Uromyces rhodesicus Wakef.	*Bauhinia galpinii* and *B. macrantha*	South Africa and Zimbabwe	[138,250]
Uromyces rhynchosporae Ellis	*Rhynchospora* spp.	Brazil, Bermuda, California, Cuba, Florida, Georgia, Hawaii, Louisiana, Japan, Massachusetts, Michigan, New Jersey, Puerto Rico, West Indies, and Vermont	[94,166,191,202,306,307,388,412,559]
Uromyces ribicola H.S. Jacks. & Holw.	*Ribes albifolium* and *R. andicola*	Bolivia, Brazil, and Colombia	[101,126,227]
Uromyces rickerianus Arthur	*Polygonum* spp. and *Rumex* spp.	Colorado, Idaho, Utah, and Wyoming	[187,368]
Uromyces riloensis Hinkova	*Doronicum cordifolium*	Bulgaria	[82]
Uromyces rostratus Henn.	*Eriosema* sp.	Rio de Janeiro	[331]
Uromyces rottboelliae Arthur	*Rottboellia compressa*, *R. exaltata*, and *R. speciosa*	Congo, India, and Philippines	[171,708]
Uromyces rubidus Arthur & Holw.	*Andropogon condensatus*	Brazil	[199]
Uromyces rudbeckiae Arthur & Holw.	*Rudbeckia* spp. and *Solidago* spp.	Canada, China, Idaho, Florida, Japan, Korea, Iowa, Missouri, Mississippi, Montana, Taiwan, Texas, Wyoming	[94,108,109,185,483,559]
Uromyces ruelliae Holw.	*Beloperone californica*, *Beloperone* sp., *Justicia brandegeana*, and *Ruellia* sp.	Arizona, California, Florida, México, and Nevada	[218,262,409,412]
Uromyces rugosus Arthur	*Lupinus* sp.	México	[398]
Uromyces rugulosus Pat.	*Campylotropis* spp. and *Lespedeza* spp.	China	[96]
Uromyces ruiz-leali J.C. Lindq.	*Anarthrophyllum elegans*	Argentina	[415]
Uromyces rumicis (Schumach.) G. Winter	*Emex australis*, *Ficaria* spp., *Medicago* spp., *Ranunculus ficaria*, and *Rumex* spp.	Argentina, Armenia, Australia, Brazil, Bulgaria, Chile, Denmark, Finland, Germany, Greece, India, Iran, Italy, Japan, Malawi, New Zealand, Norway, Pakistan, Poland, Portugal, Sicily, South Africa, Spain, Romania, Sweden, Tanzania, Turkey, Uganda, Ukraine, Uzbekistan, and Russia	[75,80,82,128,135,142,158,245,279,313,468,519,534]
Uromyces rumicis (Schumach.) G. Winter	*Rumicis* sp.	Australia, Morocco, and Switzerland	[709]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces rumicum (DC.) Fuckel	*Rumicis hydrolapathi*	Egypt and Minnesota	[179,710]
Uromyces rzedowskii J.F. Hennen & Cummins	*Ledenbergia macrantha*	México	[292,403]
Uromyces sabineae Arthur	*Poitea* spp. and *Sabinea punicea*	Cuba, Dominican Republic, Puerto Rico	[184,486]
Uromyces saginatus Syd.	*Urginea altissima*	Namibia, Zimbabwe	[138,250]
Uromyces sakawensis Henn.	*Solidago virgaurea*	Japan	[711]
Uromyces salicorniae (DC.) de Bary	*Arthrocnemum glaucum* and *Salicornia* spp.	China, Germany, Finland, Poland, Portugal, Romania, and United Kingdom	[105,133,135,195,228,329]
Uromyces salmeae Arthur & Holw.	*Galinsoga* sp. and *Salmea scandens*	Costa Rica, Dominican Republic, Guatemala, Puerto Rico, Virgin Islands, and West Indies	[125,184,225,264,281,282,406]
Uromyces salpichroae H.S. Jacks. & Holw.	*Salpichroa diffusa* and *Salpichroa* sp.	Bolivia and Ecuador	[210]
Uromyces salsolae Rabenh.	*Climacoptera* sp., *Gamanthus gamocarpus*, *Gossypium hirsutum*, *Halocharis hispida*, *Noaea* spp., *Petrosimonia* spp., and *Salsola* spp.	Algeria, China, Cyprus, Finland, Israel, Japan, Mongolia, Morocco, Pakistan, Russia, Romania, Turkey, and Ukraine	[80,81,111,146,198,228,329,435,535]
Uromyces sasaensis Gjaerum	*Valeriana kilimandscharica* and *V. volkensii*	Uganda	[317,712]
Uromyces satarensis P.B. Chavan & Bakare	*Blainvillea acmella* and *B. latifolia*	China and India	[319,713]
Uromyces saulensis Berndt	*Selysia prunifera*	France	[127]
Uromyces saururi Henn.	*Saururus chinensis* and *S. loureiroi*	China, Japan, and Taiwan	[96,97,222]
Uromyces saussureae P. Karst.	*Saussurea* sp.	Japan, Siberia	[714]
Uromyces savulescui Rayss	*Limonium sinuatum* and *Limonium* sp.	The Canary Islands, Greece, and Israel	[81,327]
Uromyces scaberulus L. Guo & Y.C. Wang	*Lespedeza bicolor*, *L. cuneate*, *L. cyrtobotrya*, and *L. formosa*	China	[156]
Uromyces scaevolae G. Cunn.	*Scaevola albida*, *S. calendulacea*, *S. spinescens*, and *S. radicans*	Australia and New Zealand	[67,313]
Uromyces schanginiae Thüm.	*Suaeda* spp.	California and Egypt	[710,715]
Uromyces schinzianus Henn.	*Bauhinia fassoglensis*, *B. reticulate*, and *B. thonningii*	Somalia, South Africa, and Uganda	[138,168]
Uromyces schismi Jørst.	*Schismus scaberrimus*	South Africa	[411]
Uromyces schoenanthi Syd. & P. Syd.	*Andropogon schoenanthus*, *Apluda mutica*, *Cymbopogon schoenanthus*, *Polytrias amaura*, and *P. diversifolia*	India, New Guinea, Pakistan, and the Philippines	[152,201,318]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces schweinfurthii Henn.	*Acacia ehrenbergiana*, *A. flava*, and *A. seyal*	South Yemen and Ethiopia	[287,687]
Uromyces scillinus (Durieu & Mont.) Har.	*Scilla autumnalis*	Algeria and Europe	[451]
Uromyces scirpi-maritimi Hirats. f. & Yoshin.	*Bolboschoenus maritimus*, *Glaux maritima*, *Scirpus fluviatilis*, and *S. maritimus*	Japan and Russia	[222,297]
Uromyces scirpinus Syd.	*Scirpus supinus*	Philippines	[232]
Uromyces scleranthi Rostr.	*Minuartia* spp. and *Scleranthus* spp.	Australia, Bulgaria, Denmark, Finland, Norway, Sweden, Turkey, and Ukraine	[80,107,128,280,329,422]
Uromyces scleriae Henn.	*Scleria* spp.	Barbados, Brazil, Colombia, Cuba, Dominica, Grenada, Guyana, Nigeria, Rio de Janeiro, Saint Lucia, Puerto Rico, Venezuela, and West Indies	[122,184,219,264,323,431]
Uromyces sclerochloae Tranzschel	*Sclerochloa dura*	Central Asia (Turkmenistan and Iran)	[161,383]
Uromyces scleropoae Baudyš & Picb.	*Scleropoa ridiga*	Croatia	[451]
Uromyces scrophulariae (DC.) Fuckel	*Scrophularia auriculata*	Carmarthenshire and Wales	[716]
Uromyces scutellatus (Schrank) Niessl	*Euphorbia* spp.	Bulgaria, Chile, Germany, Iran, Iraq, Poland, Romania, Russia, Serbia, Spain, Turkey, Ukraine, and Uzbekistan	[43,80,82,105,111,146,179,196,228, 236,347,386]
Uromyces secamones Wakef.	*Secamone platystigma*	Uganda	[168]
Uromyces sedi Gäum.	*Sedum anacampseros*	France	[717]
Uromyces seditiosus F. Kern	*Aristida* spp. and *Plantago* spp.	Alabama, Arkansas, California, Colorado, Illinois, Indiana, Kansas, Iowa, Missouri, Nebraska, Nebraska, New York, Oklahoma, Texas, Wisconsin, and Virginia	[537,559,718]
Uromyces seligeri Tranzschel & Erem.	*Lathyrus grandiflorus* and *L. sylvestris*	Greece and Russia	[220,382,421]
Uromyces sellierae G. Cunn.	*Selliera radicans*	New Zealand	[67]
Uromyces semnanensis Gjaerum	*Astragalus fridae*	Iran	[276]
Uromyces senecionicola Arthur	*Cacalia* sp., *Senecio roldana*, and *Senecio* sp.	México	[292,398]
Uromyces senecionis-gigantis Gjaerum	*Senecio gigas*	Ethiopia	[719]
Uromyces senorensis J.F. Hennen & Cummins	*Compositae*	Mexico	[703,720]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces sepultus Mains	*Setaria tenax*	America, México	[721]
Uromyces seseli-graminis E. Fisch.	*Arrhenatherum elatius*, *Melica ciliate*, and *Poae* sp.	Europe	[106]
Uromyces seselis Sousa da Câmara	*Seseli tortuosum*	Portugal	[722]
Uromyces sesseae Lagerh.	*Sessea* sp.	Ecuador	[325]
Uromyces setariae-italicae Yoshino	*Brachiaria* spp., *Chaetochloa* spp., *Eriochloa* spp., *Lasiacis* spp., *Setaria* spp., and *Urochloa* spp.	Worldwide	[294]
Uromyces shahrudensis Petr.	*Onobrychis* sp.	Iran	[723]
Uromyces shearianus Arthur		Arizona, California, Colorado, México, Utah, and Wyoming	[114,292,412,559]
Uromyces shikokianus Kusano	*Cladrastis platycarpa* and *C. shikokiana*	Japan	[222]
Uromyces sii-latifolii P. Karst.	*Sium latifolium*	Britain and Russia	[714]
Uromyces silenes (Schltdl.) Fuckel	*Arenaria glabrescens*, *Arenaria* sp., and *Silene* spp.	California, Colorado, Iowa, Kansas, Montana, Pennsylvania, Portugal, Turkey, Utah, and Washington (USA)	[80,114,454,559]
Uromyces silenes-chloraefoliae Vienn.-Bourg.	*Silene chlorifolia*	Iran	[320]
Uromyces silenes-ponticae Const.	*Silene* spp.	Bugaria, Iraq, Libya, Romania, Portugal, and Turkey	[80,82,196,228,532]
Uromyces silksvleyensis Mennicken & Oberw.	*Bartholina burmanniana*	Western Cape Province	[378]
Uromyces silphii (Syd. & P. Syd.) Arthur	*Aster macrophyllus*, *Helianthus* spp., *Heliopsis helianthoides*, *Juncus* spp., and *Silphium* spp.	Argentina, Canada, Czech Republic, Chile, Florida, Georgia, Idaho, Illinois, Iowa, México, Minnesota, Missouri, New York, Oklahoma, Oregon, Pennsylvania, Poland, Texas, Uruguay, Washington, Wisconsin, and Vermont	[185,187,191,292,415,559]
Uromyces simulans Peck	*Vilfa* sp.	Colorado	[724]
Uromyces siphocampyli-gigantei Berndt	*Siphocampylus giganteus*	Ecuador	[725]
Uromyces sisyrinchiicola Speg.	*Sisyrinchium iridifolium*	Chile	[258]
Uromyces skottsbergii Jørst.	*Enargea marginata*	Argentina and the Falkland Islands	[726,727]
Uromyces smilacis Mayor	*Smilax* sp.	Colombia	[226,227]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces snowdeniae Cummins	*Snowdenia scabra*	Kenya	[140]
Uromyces socius Arthur & Holw.	*Loranthus* spp. and *Struthanthus* spp.	Guatemala and México	[15,281]
Uromyces solani Dietel & Holw.	*Solanum appendiculatum*	Colombia, Guatemala, and México	[227,281,456,479]
Uromyces solariae Dietel	*Solaria miersioides*	Chile	[240]
Uromyces solidaginis (Sommerf.) Fuckel	*Solidago* spp.	Colorado, Finland, Idaho, Japan, Montana, Oregon, Poland, Russia, Washington, and Wyoming	[92,329,454,559]
Uromyces solidaginis-caricis Arthur	*Carex varia*	Indiana	[728]
Uromyces solidus Berk. & M.A. Curtis	*Desmodium strictum*	North Carolina	[657]
Uromyces sommerfeltii Hyl., Jørst. & Nannf.	*Solidago* spp.	China, Canada, Germany, Finland, Idaho, Japan, Russia, Mississippi, Montana, Nepal, Norway, Oregon, Poland, Russia, Sweden, and Turkey	[80,94,129–131,135,185,187,436,475,567]
Uromyces sonorensis J.F. Hennen & Cummins	*Merremia palmeri*	México	[729]
Uromyces sophorae Peck	*Sophora alopecuroides*, *S. sericea*, and *S. mollis*	Pakistan and México	[563,730]
Uromyces sophorae-flavescentis Kusano	*Sophora alopecuroides*, *S. angustifolia*, *S. flavescens*, *S. jaubertii*, and *S. japonicum*	China, Japan, Korea, Turkey, Russia, and Uzbekistan	[96,146,297,483]
Uromyces sophorae-japonicae Dietel	*Sophora japonica*	Japan	[92,731]
Uromyces sophorae-vicifoliae F.L. Tai	*Sophora viciifolia*	China	[732]
Uromyces sparaxidis Syd. & P. Syd.	*Sparaxis lineata*, *S. tricolor*, and *Sparaxis* sp.	South Africa	[142]
Uromyces sparganii Cooke & Peck	*Acorus calamus*, *Hypericum virginicum*, and *Sparganium eurycarpum*	Canada, Iowa, Indiana, India, Michigan, Mississippi, New York, Nebraska, and Wisconsin	[152,185,475]
Uromyces sparsus (Kunze & J.C. Schmidt) Lév.	*Arenaria marina*, *Spergularia* spp. and *Stellaria patens*	Bulgaria, Denmark, Finland, Germany, Nepal, Norway, Romania, and Ukraine	[82,111,128,135,179,188,228,329]
Uromyces spartii-juncei P. Syd. & Syd.	*Spartium junceum*	France, Greece, Portugal, Spain, Switzerland, and Yugoslavia	[220]
Uromyces speciosus Holw.	*Frasera macrophylla*	Colorado and New México	[559,733]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces spegazzinii (De Toni) Arthur	*Commelina angustifolia*, *C. elegans*, *C. erecta*, *C. nudiflora*, and *C. virginica*	Florida, Taiwan, Texas, and the Virgin Islands	[299,447]
Uromyces spermacoces (Schwein.) Thüm.	*Diodia teres*, *D. virginiana*, *Diodia* sp., and *Spermacoce tenuior*	Brazil, Carolina, Florida, Georgia, Indiana, Missouri, Mississippi, Oklahoma, Pennsylvania, and Texas	[202,203,262,455,584]
Uromyces sphaericus H.S. Jacks. & Holw.	*Perymenium ecuadoricum*	Ecuador	[210,219]
Uromyces sphaerocarpus Syd. & P. Syd.	*Indigofera potaninii*, *I. pseudotinctoria*, *I. tinctoria*, and *Indigofera* sp.	China and Japan	[96,734]
Uromyces sphaerophysae Pospelov ex Nevod.	*Swainsona salsula*	China	[198]
Uromyces splendens A. Blytt	*Astragalus oroboides*	Norway	[735]
Uromyces sporoboli Ellis & Everh.	*Allium* spp., *Sporobolus* spp.	Bolivia, Chile, Indiana, Kansas, Iowa, Missouri, Nebraska, Puerto Rico, Texas, and Wisconsin	[199,386,559,635]
Uromyces sporobolicola J.C. Lindq.	*Sporobolus marginatus*, *S. pyramidalis*, and *S. pyramidatus*	Argentina, India, Pakistan, and México	[171,415,488,736]
Uromyces sporoboloides Cummins	*Sporobolus berteroanus*	Ecuador	[737]
Uromyces spragueae Harkn.	*Calyptridium umbellatum*, *C. umbellatum* var. *caudiciferum*, *Spraguea umbellate*, and *Spraguea* sp.	California, Oregon, and Wyoming	[186,559,658]
Uromyces standleyanus Arthur	*Gaudichaudia schiedeana*	El Salvador	[301]
Uromyces statices Berk. & M.A. Curtis	*Statice* sp.	California	[598]
Uromyces statices-mucronatae Malençon	*Statice mucronata*	Morocco	[279]
Uromyces statices-sinensis Liou & Y.C. Wang	*Statice sinensis*	China	[543]
Uromyces steironematis Arthur	*Spartina michauxiana*	Nebraska	[738]
Uromyces stellariae Syd. & P. Syd.	*Stellaria kotschyana*	Iran	[739]
Uromyces stellariae-saxatilis L. Guo & Y.C. Wang	*Stellaria media*, *S. saxatilis*, *S. vestita*, and *Stellaria* sp.	China	[96]
Uromyces stenorrhynchi Henn.	*Stenorrhynchus* sp.	Peru	[740]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces stipinus Tranzschel & Erem.	*Stipa rubens*	Russia	[106]
Uromyces strauchii Doidge	*Clutia daphnoides*	Southern Africa	[138]
Uromyces striatellus Tranzschel	*Euphorbia esula*, *E. leptocaula*, *E. sieboldiana*, and *Euphorbia* sp.	China, Iran, Japan, Ukraine, and Russia	[94,108,109,157,297]
Uromyces striatus J. Schröt.	*Argyrolobium* spp., *Cicer arietinum*, *Ervum lens*, *Euphorbia* spp., *Hosackia* sp., *Hymenocarpos circinnatus*, *Lathyrus odoratus*, *Lens culinaris*, *Lotus* spp., *Manihot esculenta*, *Medicago lupulina*, *Melilotus* spp., *Pisum* spp., *Trifolium* spp., and *Vicia* spp.	Worldwide	[104,165,220,222,225]
Uromyces striolatus Tranzschel	*Euphorbia aff-esula*, *E. boissieriana*, *E. cyparissias*, *E. esula*, and *Euphorbia* sp.	Bulgaria, China, Iran, and Pakistan	[82,108,157,317,356]
Uromyces strobilanthis Barclay	*Pteracanthus urticifolius*,*Strobilanthes alata*, *S. dalhousieana*, and *Strobilanthes* sp.	India, Pakistan, Taiwan, and the Philippines	[218,563,565]
Uromyces strumariae A.R. Wood	*Strumaria gemmata*	Western Cape Province	[741]
Uromyces struthanthi Perd.-Sánch.	*Struthanthus* sp.	Panama	[15]
Uromyces stylochaetonis Doidge	*Stylochaeton natalense*	KwaZulu-Natal	[249]
Uromyces sublevis Tranzschel	*Euphorbia baetica*, *E. petrophila*, and *E. tictoria*	Lebanon, Portugal, and Ukraine	[157,158,422,449]
Uromyces substriatus Syd. & P. Syd.	*Lupinus argenteus*	Montana	[79]
Uromyces suksdorfii Dietel & Holw.	*Lychnis drummondii*, *Lychnis* sp., *Silene oregano*, *S. pacifica*, *S. scouleri*, and *Silene* sp.	Arizona, California, Idaho, Oregon, Utah, México, and Washington	[114,116,187,454,559]
Uromyces superfixus Vestergr.	*Bauhinia mirandina*, *B. mollis*, and *Bauhinia* sp.	Argentina, Brazil, Bolivia, and Venezuela	[216,394,431]
Uromyces superfluus P. Syd. & Syd.	*Panicum antidotale* and *P. depauperatum*	America, India, and Pakistan	[144,171,294]
Uromyces superstomatalis Berndt	*Cayaponia rigida*	France	[127]
Uromyces suzukii Sawada ex Hirats. f.	*Sigesbeckia orientalis*	China, Japan, and Taiwan	[94,108,319]
Uromyces symaethidis W. Schneid.	*Simethis bicolor*	Italy	[742]
Uromyces tairae Hirats. f.	*Messerschmidia argentea*	Japan	[743]
Uromyces tarapotensis Henn.	*Camptosema* sp.	Peru	[575]
Uromyces teheranicus Petr.	*Trifolium retense*	Iran	[744]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces tehuelches Speg.	*Alstroemeria patagonica*	Argentina	[167,592]
Uromyces tener J. Schröt.	*Manettia gracilis*	Brazil	[219,331]
Uromyces tenuicutis McAlpine	*Parietaria judaica* and *Sporobolus* spp.	Australia, China, Fiji, Ghana, Guyana, Grenada, India, Japan, Jamaica, Kenya, Malawi, México, Malaysia, Nigeria, Pakistan, Philippines, Puerto Rico, South Africa, Sierra, Taiwan, Uganda, Virgin Island, West Indies, and Zimbabwe	[97,171,172,184,243,244,280,615]
Uromyces tenuistipes Dietel & Holw.	*Desmodium* spp. and *Meibomia* sp.	Bolivia, Colombia, Cuba, and México	[172,479,597,745]
Uromyces teodorescui Rayss	*Onobrychis crista-galli*	Israel and Palestine	[81]
Uromyces tepicensis J.F. Hennen & Cummins	*Loeselia amplectens*	México	[292]
Uromyces tessariae (Speg.) J.C. Lindq.	*Tessaria absinthioides*	Spain	[746]
Uromyces thapsi Opiz ex Bubák	*Verbascum* spp.	Greece, Romania, Spain, Turkey, Ukraine, and Uzbekistan	[111,146,158,228,421]
Uromyces thellungi Maire	*Rumex roseus*, *R. simpliciflorus*, and *R. vesicarius*	Canary Islands, Iran, Israel, and Pakistan	[472]
Uromyces thelymitrae McAlpine	*Thelymitra antennifera* and *T. flexuosa*	Australia	[81,280,317,356]
Uromyces thermopsidicola Shimab.	*Thermopsis chinensis*	Japan	[222]
Uromyces tinctoriicola Magnus	*Euphorbia* spp.	Armenia, Germany, Iraq, Morocco, Spain, Turkey, Romania, and Ukraine	[80,196,228,422,519]
Uromyces tingitanus Henn.	*Rumex* spp.	The Canary Islands, Libya, and Morocco	[197,279]
Uromyces tolerandus H.S. Jacks. & Holw.	*Manihot esculenta* and *Manihot* sp.	Brazil	[219]
Uromyces tomentellus Cooke	*Leguminosae* sp.	California	[747]
Uromyces tordillensis Speg.	*Euphorbia serpens* and *E. ovalifolia*	Argentina, Chile, Córdoba, and Uruguay	[371,386]
Uromyces tosensis Henn.	*Commelina communis*	Japan	[711]
Uromyces tournefortiae Henn.	*Tournefortia* sp.	Brazil	[600]
Uromyces tragi Wakef. & Hansf.	*Tragus berteronianus*	Malawi and Uganda	[168,273]
Uromyces transcaspicus Petr.	*Astragalus angustidens*	Turkmenistan	[748]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces transversalis (Thüm.) G. Winter	*Crocosmia* spp., *Freesia refracta*, *Gladiolus* spp., *Tritonia* spp., and *Watsonia* spp.	Argentina, Australia, Brazil, California, Cuba, England, Florida, France, Malwai, Martinique, Mauritius, México, New Zealand, South Africa, Tanzania, Uganda, Venezuela, Zambia, and Zimbabwe	[69,142,209,250,273,487,530,650]
Uromyces tranzschelii Syd. & P. Syd.	*Euphorbia crenulata*, *E. lucida*, *E. montana*, *E. palmeri*, *E. robusta*, and *E. robusta*	Azirona, Colorado, Montana, Oregon, Utah, and Wyoming	[103,157,187,292,368,412]
Uromyces traucoensis Monteal. & Oehrens	*Selliera radicans*	Chile	[749]
Uromyces triandrae T.S. Ramakr. & Sriniv.	*Themeda triandra*	India	[669]
Uromyces trichoclines Henn.	*Trichocline polymorpha*	Brazil	[219,323]
Uromyces tricholenae Gonz. Frag. & Cif.	*Tricholaena rosea*	Dominican Republic	[750]
Uromyces trichoneurae Doidge	*Astrebla elymoides*, *A. lappacea*, *A. pectinate*, *A. squarrosa*, *Trichoneura grandiglumis*, and *T. lisboae*	Australia, India, South Africa	[169,488,751]
Uromyces tricorynes McAlpine	*Tricoryne elatior*	Australia	[245,267]
Uromyces trifolii-megalanthi (Dietel & Neger) H.S. Jacks. & Holw.	*Trifolium peruvianum* and *Trifolium* sp.	Brazil, Chile, and Peru	[101,126]
Uromyces trifolii-purpurei Const.	*Trifolium campestre*, *T. eriosphaerum*, *T. purpureum*, *T. scabrum*, *T. stellatum*, and *Trifolium* sp.	Bulgaria, Greece, France, Israel, Italy, Russia, Romania, and Spain	[81,82,126,228,327]
Uromyces trifolii-repentis Liro	*Trifolium* spp.	Worldwide	[225,361]
Uromyces trigonellae Pass.	*Trigonella* spp.	Bulgaria, Israel, Romania, and Turkey	[80–82,197,228,357]
Uromyces trigonellae-occultae Henn.	*Trigonella occulta*	Egypt	[752]
Uromyces tripogonicola Payak & Thirum.	*Tripogon lisboae*	India	[753]
Uromyces tripogonis-sinensis Y.C. Wang	*Tripogon chinensi* and *T. lisboae*	China and India	[106,108,109]
Uromyces tripsaci F. Kern & Thurst.	*Tripsacum dactyloides*	Ecuador and Venezuela	[431,754]
Uromyces triquetrus Cooke	*Ascyrum hypericoides*, *Hypericum* spp., and *Triadenum japonicum*	Argentina, Brazil, California, Canada, China, Colombia, Indiana, Indonesia, Iowa, Maine, México, Missouri, Mississippi, Taiwan, Oregon, Japan, and Wisconsin	[96,97,187,219,252,255,292,412,415,449,475]
Uromyces triseti Katajev	*Trisetum cavanillesii*	Turkmenistan	[106]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces triteleiae Dietel & Neger	*Brodiaea porrifolia*, *Leucocoryne alliacea*, and *Triteleia porrifolia*	Chile	[162,166,240,415]
Uromyces trollii-caroli Ulbr.	*Trifolium* sp.	Germany and India	[34,755]
Uromyces trollipii Kalchbr. & MacOwan	*Roepera foetida* and *Zygophyllum foetidum*	South Africa	[138,385]
Uromyces tropaeoli Ranoj.	*Tropaeolum major*	Yugoslavia	[212]
Uromyces truncatulus Trotter	*Geranium versicolor*	Greece	[421]
Uromyces truncicola Henn. & Shirai	*Sophora japonica* and *Sophora* sp.	China, Japan, and Korea	[468,483,734]
Uromyces tuberculatus Fuckel	*Euphorbia* spp.	The Balearic Islands, Canary Islands, China, Finland, Germany, Iran, Malaysia, Romania, Pakistan, Portugal, Spain, and Uzbekistan	[105,129,130,228,317,318,329,356]
Uromyces tulipae Dietel	*Tulipa edulis*	Japan	[756]
Uromyces tungurahuensis Syd.	*Aspilia lanceolata*	Ecuador	[757]
Uromyces turcomanicus Katajev	*Muscari leucostomum*, *Hordeum bulbosum*, *H. marinum*, and *H. spontaneum*	Iraq, Jordan, Libya, Russia, and Turkmenistan	[126,243,244]
Uromyces tylosemae Gjaerum	*Tylosema fassoglensis*	Uganda and Sudan	[428]
Uromyces uleanus Dietel	*Euphorbia* sp.	Brazil	[143,219]
Uromyces umiamensis Berndt & Baiswar	*Cucumis* sp. and *Momordica cochinchinensis*	India	[127,212,234]
Uromyces undulatoparietis B. Li	*Ligularia hookeri*	China	[108,109]
Uromyces undulatus Tranzschel	*Euphorbia condylocarpa* and *Euphorbia* sp.	Armenia and Iran	[157,318]
Uromyces unioniensis Viégas	*Desmodium* sp. and *Meibomia* sp.	Brazil	[394,640]
Uromyces unitus Peck	*Calandrinia leeana*	Washington (USA)	[758]
Uromyces urariae B. Li	*Uraria lagopodioides*	China	[759]
Uromyces urbanianus Henn.	*Oryctanthus spicatus*	Argentina, Brazil, Colombia, Guatemala, Honduras, México, and Trinidad and Tobago	[15,227,473]
Uromyces urgineae M.S. Patil	*Urginea indica*	India	[397]
Uromyces ushuwaiensis Speg.	*Impatiens hochstetteri*	Ethiopia	[258,760]
Uromyces ustalis Tranzschel	*Ranunculus repens*	Siberia	[761]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces usterianus Dietel	*Myrtaceae*	Colombia and São Paulo	[762]
Uromyces valens F. Kern	*Carex aestivalis*, *C. lupulina*, and *C. utriculata*	Indiana, North Carolina, and Wisconsin	[763–765]
Uromyces valerianae (Schumach.) Fuckel	*Valerianella* spp.	Bulgaria, China, Czech Republic, Czechoslovakia, Denmark, Finland, France, Germany, Greece, Japan, Mongolia, Norway, Poland, Romania, Scotland, Spain, South Africa, Sweden, Switzerland, Taiwan, Turkey, and Ukraine	[80,82,90,94,128,132,133,135,138,228,283,421,440]
Uromyces valerianae-microphyllae Berndt	*Valeriana microphylla*	Ecuador	[766]
Uromyces valerianae-wallichii (Dietel) Arthur & Cummins	*Valeriana* spp.	China, Japan, Taiwan, India, and Pakistan	[87,88,94,108,109,356]
Uromyces valesiacus E. Fisch.	*Vicia ervilia* and *V. onobrychioides*	Albania, Bulgaria, France, Greece, Romania, Switzerland, Turkey, and Yugoslavia	[82,126,220]
Uromyces vanderystii Henn.	*Teramnus labialis*	The Democratic Republic of the Congo	[610]
Uromyces vankyorum Berndt	*Atriplex lampa*	Argentina	[282]
Uromyces venustus Dietel & Holw.	*Cestrum nitidum*	México	[292,375]
Uromyces veratri (DC.) J. Schröt.	*Adenostyles* spp., *Homogyne alpine*, *Ligularia* spp., and *Veratrum* spp.	Austria, Bulgaria, China, Germany, Japan, Korea, Poland, Romania, Russia, Spain, Switzerland, and Turkey	[82,135,158,222,228,231,283,402]
Uromyces verbasci Niessl	*Verbascum* spp.	Bulgaria, Germany, Poland, and Ukraine	[82,105,135]
Uromyces verrucosae-craccae Mayor	*Vicia cracca*	France and Switzerland	[126,220]
Uromyces verruculosus J. Schröt.	*Arenaria serpyllifolia*, *Cucubalus baccifer*, *Dianthus armeria*, *Lychnis* spp., *Melandrium* spp., and *Silene* spp.	Armenia, Bulgaria, Czech Republic, Denmark, Greece, Germany, Indiana, Iran, Michigan, New York, Norway, Poland, Romania, Sweden, Texas, Turkey, Ukraine, and Wisconsin	[105,107,135,228,317,422,519]
Uromyces verus H.S. Jacks. & Holw.	*Bauhinia rufa*	Brazil	[101]
Uromyces vesicatorius (Bubák) Nattrass	*Lens esculenta* and *L. leontopetalum*	Cyprus, Iraq, Israel, and Turkey	[80,81,196,599]
Uromyces vesiculosus G. Winter	*Zygophyllum* spp.	Australia	[245]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces vestergrenii P. Syd. & Syd.	*Bauhinia tomentosa*	India and Sri Lanka	[165]
Uromyces viciae-craccae Const.	*Ervum lens*, *Euphorbia* sp., *Lathyrus aphaca*, *Lens* spp., and *Vicia* spp.	Armenia, Austria, Azerbaijan, Bulgaria, China, Czech Republic, Finland, France, Germany, Georgia, Greece, Hungary, Iran, Itlay, Kazakhstan, Poland, Romania, Russia, Siberia, Switzerland, Ukraine, and Yugoslavia	[82,135,220,767,768]
Uromyces viciae-fabae (Pers.) J. Schröt.	*Vicia* spp., *Lathyrus* spp., and *Pisum* spp.	Worldwide	[71,222,236,238,769]
Uromyces *viciae-unijugae* S. Ito	*Vicia unijuga*	Japan	[92]
Uromyces vicinus H.S. Jacks. & Holw.	*Ipomoea* sp.	Brazil	[219]
Uromyces vicosensis R.T. Almeida	*Bauhinia* sp.	Brazil	[219]
Uromyces viegasii R.T. Almeida	*Bauhinia forficata* and *Bauhinia* sp.	Brazil	[219,394]
Uromyces viennot-bourginii J. Anikster & I. Wahl	*Bellevalia eigii* and *Hordeum spontaneum*	Israel	[81]
Uromyces vignae Barclay	*Desmodium* spp., *Dipogon* spp., *Lablab* sp., *Phaseolus* sp., *Sphenostylis* sp., and *Vigna vexillata*	Worldwide	[71,222,225]
Uromyces vignae-luteolae Henn.	*Vigna luteola*	Congo	[610]
Uromyces vignae-sinensis Miura	*Vigna sinensis*	China and Japan	[89,96]
Uromyces visci T. Majewski & K.A. Nowak	*Viscum congolense*	Rwanda	[551]
Uromyces volkartii Gäum. & Terrier	*Trisetum flavescens*	Switzerland	[770]
Uromyces vossiae Barclay	*Phacelurus speciosus*, *Rottboellia* sp., and *Vossia speciosa*	India and Pakistan	[106,294,771]
Uromyces vulpiae Sousa da Câmara	*Vulpia broteri*	Portugal	[772]
Uromyces waipoua McNabb	*Hypericum gramineum* and *H. japonicum*	New Zealand	[313]
Uromyces wartoensis Petr.	*Astragalus wartoensis*	Armenia and Turkey	[220,276]
Uromyces wedeliae Henn.	*Wedelia bicolour*, *W. biflora*, *W. chinensis*, *W. menotriche*, and *W. prostrata*	China, Eritrea, Fiji, Japan, Micronesia, Philippines, Taiwan, and Tonga	[94,97,108,109,287,565,654]
Uromyces wedeliae-biflorae Boedijn	*Wedelia biflora*	Indonesia	[309]
Uromyces wellingtonicus T.S. Ramakr. & K. Ramakr.	*Sporobolus indicus*	India	[629]

Table 3. *Cont.*

Species	Host	Locality	Reference
Uromyces wiehei Cummins	*Thalictrum rhynchocarpum*	Kenya, Malawi, and Uganda	[318,609,712]
Uromyces wolfii Cummins	*Borreria laevis*	Venezuela	[609]
Uromyces wulffiae Henn.	*Wulffia baccata*, *W. maculata*, *W. scandens*, *W. stenoglossa*, and *Wulffia* sp.	Brazil	[219,394,575]
Uromyces wulffiae-stenoglossae Dietel	*Wulffia baccata*, *W. maculata*, *W. stenoglossa*, and *Wulffia* sp.	Brazil, French Guiana, Guyana, Trinidad and Tobago, Venezuela, and West Indies	[120,219,264,431,557]
Uromyces yakushimensis Hirats. f. & Katsuki	*Trichosanthes bracteata*, *T. multiloba*, and *T. palmata*	Japan and Myanmar	[94,127,212]
Uromyces yoshinagae Henn.	*Pisum sativum*	Honshu	[360]
Uromyces yurimaguasensis Henn.	*Clitoria guianensis* and *Clitoria* sp.	Belize and Peru	[172,575,721]
Uromyces zeyheri Bubák	*Ixia scillaris*, *I. scillaris*, and *Tritonia pallida*	South Africa	[123,138,165]
Uromyces zigadeni Peck	*Zigadenus paniculatus*	Utah	[328]
Uromyces zizaniae-latifoliae Sawada	*Zizania latifolia*	Taiwan	[773]

5.5. Endemic/Native Uromyces Species

The distribution of rust fungi is governed by various ecological factors that affect their host range and endemism. As with other biotrophic pathogens, rust fungi are also found to be co-evolved with their host plants, which possibly justifies their host specificity and narrow host range. However, cross-infection in rust fungi is also observed, which opens up the need for further investigation of their host range. Among various rust fungi, the genus *Uromyces* also exhibited a broad host diversity among different terrestrial regions of the world. An analysis of data collected in the present study revealed the restriction of the *Uromyces* species towards a single host. More than 400 species of *Uormyces* were found to be endemic to more than 100 countries, provinces, or islands. The distribution of endemic species of *Uromyces* showed that the highest number of endemic species was found in Brazil (41 species) and South Africa (33 species). Other countries, such as China (18), Chile (18), Japan (17), India (17), México (15), France (12), Argentina (11), Australia (11), and Ecuador (11), showed a medium to low endemic distribution of these fungi. If we compare the continental distributions, it is clear from the geographical heat map that there is a big difference between the prevalence of endemic species in North and South America. In fact, South America showed the occurrence of the endemic *Uromyces* species. Similarly, Asia also holds a high number of species endemic to the different countries or regions in the continent. The distribution of the endemic species was found to be scattered compared to European countries; however, the number of endemic species in this region was comparatively high. Detailed information on the distribution of endemic or native *Uromyces* species is presented in Table 4 and Figure 9.

Table 4. World distribution of endemic/native *Uromyces* species.

***Uromyces* Species**	**Host**	**Country**	**Reference**
Uromyces actinostemonis	*Actinostemon concolor*	Brazil	[103]
Uromyces acutatus	*Gageabohemica* and *G. villosa*	Germany	[105]
Uromyces aegopogonis	*Aegopogon cenchroides*, *A. geminiflorus*, *A. gracilis*, and *A. tenellus*	México	[106]
Uromyces aeluropodinus	*Aeluropus littoralis*	Ukraine	[111]
Uromyces agnatus	*Jatropha stimulosa*	Florida	[112]
Uromyces agropyri	*Agropyron* sp.	India	[126]
Uromyces aimeae	*Cucurbitaceae*	Ecuador	[127]
Uromyces albiziae	*Albizia procera*	Indinesia	[136]
Uromyces allii-monanthi	*Allium monanthum*	Japan	[147]
Uromyces allii-sibirici	*Allium sibiricum*	Norway	[149]
Uromyces allii-victorialis	*Allium fistulosum*, *A. macrostemon*, and *A. victorialis*	China	[90]
Uromyces alsinis	*Minuartia hamata* and *M. meyeri*	Turkey	[80]
Uromyces alyxiae	*Alyxia oliviformis*	Hawaii	[176]
Uromyces amphilophis-insculptae	*Amphilophis insculpta*	India	[194]
Uromyces anabasis	*Anabasis aphylla*	China	[195]
Uromyces anomathecae	*Anomatheca cruenta*	South Africa	[169]
Uromyces anotidis	*Anotis richardiana*	Sri Lanka	[214]
Uromyces antioquiensis	*Rhynchospora polyphylla* and *R. nervosa*	Colombia	[119,226,227]
Uromyces antipae	*Rosa lutea*	Romania	[228]
Uromyces aphelandrae	*Aphelandra pectinata*	Costa Rica	[218]

Table 4. *Cont.*

Uromyces Species	Host	Country	Reference
Uromyces aquiriensis	*Cucurbitaceae*	Israel	[127]
Uromyces araucanus	*Senecio otites*	Chile	[240]
Uromyces arenariae-grandiflorae	*Arenaria saponarioides*	Turkey	[80]
Uromyces argutus	*Spartina alterniflora* and *S. glabra*	Florida	[106]
Uromyces asperulae	*Asperula conferta* and *A. oligantha*	Australia	[268]
Uromyces aspiliellus	*Aspilia latifolia*	Ivory Coast	[270]
Uromyces astragali-alopecuri	*Astragalus alopecurus*	Turkey	[276]
Uromyces astragali-atropilosuli	*Astragalus atropilosulus*	Kenya	[276]
Uromyces astragali-pseudoutrigeris	*Astragalus pseudoutriger*	Turkey	[276]
Uromyces atlanticus	*Hippocrepis scabra*	Morocco	[279]
Uromyces azorellae	*Pozoa trifoliate* and *Schizeilema trifoliolatum*	New Zealand	[284]
Uromyces babianae	*Babiana disticha*	Western Cape Province	[285]
Uromyces baccarinii	*Wedelia* sp.	Eritrea	[287]
Uromyces badius	*Haemanthus coccineus*, *H. pumilio*, *H. rotundifolius*, and *H. sanguineus*	South Africa	[167]
Uromyces bahiensis	On leaves of *Loranthaceae*	Panama	[15]
Uromyces bauhiniicola	*Bauhinia chlorantha* and *B. pringlei*	México	[398]
Uromyces beckmanniae	*Beckmannia eruciformis* and *B. syzigachne*	Oregon	[295]
Uromyces belemensis	*Ormosia nobilis*	Brazil	[219]
Uromyces bermudianus	*Cyperus paniculatus*	Bermuda	[224]
Uromyces bethelii	*Silene verecunda*	California	[301]
Uromyces bisbyi	*Eriogonum parvifolium*	California	[314]
Uromyces boissierae	*Boissiera pumilio*	Iran	[320]
Uromyces bolusii	*Aspalathus pachyloba*	South Africa	[322]
Uromyces bomareae	*Bomarea* sp.	Brazil	[167]
Uromyces bonaerensis	*Gomphrena elegans*	Buenos Aires	[324]
Uromyces bonae-spei	*Tritonia scillaris* and *Acidanthera pallida*	Southern Africa	[325]
Uromyces bonaveriae	*Bonaveria securidaca* and *Securigera securidaca*	Greece	[327]
Uromyces borreriae	*Borreria verticillata*	Rio de Janeiro	[331]
Uromyces bosseri	*Trochomeriopsis diversifolia*	Madagascar	[127]
Uromyces bothriochloae-intermediae	*Bothriochloa intermedia*	China	[108,109]
Uromyces bradburyae	*Bradburya pubescens*, *B. virginiana*, *Centrosema pubescens*, and *C. virginianum*	Brazil	[219]
Uromyces brizae	*Briza media*	France	[339]
Uromyces bromicola	*Bromus coloratus* and *B. lithobius*	Chile	[199]
Uromyces buforrestiae	*Buforrestia imperforata*	Ghana	[341]
Uromyces bulbinicola	*Bulbine bulbosa*	Australia	[249]
Uromyces bunsteri	*Sisyrinchium cuspidatum* and *S. graminifolium*	Chile	[166]
Uromyces calopogonii	*Calopogonium galactioides*	Guatemala	[172]

Table 4. *Cont.*

Uromyces Species	Host	Country	Reference
Uromyces calotheus	*Urginea* sp.	Sierra Leone	[351]
Uromyces calycotomes	*Calycotome spinosa*	France	[220]
Uromyces caricis-brunneae	*Carex brunnea*	Japan	[94]
Uromyces caricis-schmidtii	*Carex schmidtii*	Khabarovsk	[297]
Uromyces cassiae-mimosoidis	*Cassia mimosoides* and *Chamaecrista mimosoides*	South Africa	[172]
Uromyces cearensis	*Ipomoea* sp.	Brazil	[373]
Uromyces cedrelae	*Toona serrata*	Indonesia	[177]
Uromyces celtidis	*Celtis* sp.	Brazil	[102]
Uromyces cenisiae	*Ononis cenisia*	France	[342]
Uromyces chaetobromi	*Chaetobromus dregeanus* and *C. schraderi*	South Africa	[378]
Uromyces chilensis	*Lathyrus magellanicus* and *L. multiceps*	Chile	[386]
Uromyces chiovendae	*Cissus* sp.	Somalia	[287]
Uromyces chorizanthis	*Chorizanthe pungens*	California	[388]
Uromyces christensenii	*Muscari parviflorum* and *Hordeum bulbosum*	Israel	[390]
Uromyces chubutensis	*Poa chubutensis*	Chubut	[391]
Uromyces ciceris-soongaricae	*Cicer songaricum*	Pakistan	[393]
Uromyces circinalis	*Scilla prasina*	South Africa	[138]
Uromyces cladomanes	*Vitis* sp.	Somalia	[287]
Uromyces cladrastidis	*Cladrastis shikokiana*	Japan	[92]
Uromyces clignyioides	*Monocymbium ceresiiforme*	Zimbabwe	[243]
Uromyces clitoriae	*Clitoria mexicana*	México	[172]
Uromyces clivalis	*Argyrolobium flaccidum*	India	[357]
Uromyces cobresiae	*Carex* sp.	Uzbekistan	[146]
Uromyces collinus	*Bauhinia* sp.	México	[292]
Uromyces coluteae	*Colutea arborescens*	Austria	[299]
Uromyces combreti	*Combretum* sp.	Myanmar	[405]
Uromyces conicus	*Cleome* sp.	Bolivia	[411]
Uromyces correntinus	*Rhynchospora tenuis*	Argentina	[415]
Uromyces costesianus	*Sphaeralcea velutina*	Chile	[386]
Uromyces crepidis-fraasii	*Crepisfraasii* sp.	Greece	[419]
Uromyces cretensis	*Coronilla parviflora* and *C. rostrata*	Greece	[421]
Uromyces crotalariae-nitens	*Crotalaria nitens*	Colombia	[423]
Uromyces cruchetii	*Borreria tenella*	Colombia	[226]
Uromyces cucumivorus	*Cucumis melo*	Iraq	[127]
Uromyces cuenodii	*Silene eriocalycina*	Iraq	[196]
Uromyces cyanotidis	*Cyanotis capitata*	Papua New Guinea	[426]
Uromyces cyathulae	*Cyathula globulifera*	Eritrea	[287]
Uromyces dendroseridis	*Dendroseris micrantha*	Chile	[240]
Uromyces densus	*Bidens pilosa*	Puerto Rico	[76,77]
Uromyces desmodiicola	*Desmodium albiflorum*	Brazil	[102]

Table 4. *Cont.*

Uromyces Species	Host	Country	Reference
Uromyces desmodii-leiocarpi	*Desmodium leiocarpum*	Brazil	[172]
Uromyces dieramatis	*Dierama* spp.	South Africa	[273]
Uromyces dilucidus	*Sisyrinchium striatum*	Argentina	[415]
Uromyces diniensis	*Ononis fruticosa*	France	[460]
Uromyces dipcadi	*Dipcadi viride*	Kenya	[487]
Uromyces discariae	*Discaria toumatou*	New Zealand	[313]
Uromyces dispersus	*Apios fortunei*	Japan	[222]
Uromyces dobremezii	*Euphorbia stracheyi*	Nepal	[464]
Uromyces doebbeleri	*Hypericum irazuense*	Costa Rica	[310]
Uromyces dorystaechadis	*Dorystaechas hastata*	Turkey	[471]
Uromyces drimiopsidis	*Drimiopsis maculata*	South Africa	[138]
Uromyces dubiosus	*Lantana* sp.	Goiás	[291]
Uromyces ducellieri	*Anabasis aphylla*	China	[91]
Uromyces dusenii	*Gilliesia graminea*, *G. monophylla*, *Miersia chilensis*, and *Ornithogalum biflorum*	Chile	[240]
Uromyces echinodes	*Asclepiadaceae*	Suriname	[473]
Uromyces eclipsis	*Zygophyllum morgsana*	South Africa	[234]
Uromyces edwardsiae	*Edwardsia* spp. and *Sophora* spp.	New Zealand	[284]
Uromyces ehrhartae-giganteae	*Ehrharta* spp.	South Africa	[429]
Uromyces ellipticus	*Glycyrrhiza astragalina*	Chile	[240]
Uromyces ellisianus	*Euphorbia marginata*	Minnesota	[277]
Uromyces emmeorhizae	*Emmeorhiza umbellata*	Venezuela	[478]
Uromyces eriogoni	*Eriogonum virgatum*	California	[388]
Uromyces ermelensis	*Indigofera* sp.	South Africa	[138]
Uromyces erythrinae	*Erythrina* sp.	Ecuador	[165]
Uromyces euphlebius	*Phoradendron calyculatus*	México	[15]
Uromyces euphorbiae-javanicae	*Euphorbia javanica*	Indonesia	[309]
Uromyces euphorbiae-lunulatae	*Euphorbia esula*, *E. Kansui*, and *E. lunulata*	China	[108,109]
Uromyces evastigatus	*Phthirusa pyrifolia*	El Salvador	[15]
Uromyces fiebrigii	*Bauhinia* sp.	Paraguay	[216]
Uromyces fiorianus	*Peucedanum fraxinifolium* and *Peucedanum* sp.	South Africa	[138]
Uromyces flemmingiae	*Flemingia* sp.	Uganda	[507]
Uromyces fleuryae	*Fleurya podocarpa*	Gabon	[508]
Uromyces floralis	*Bauhinia hiemalis*, *B. cuyabensis*, *B. Holophylla*, and *B. rufa*	Brazil	[102]
Uromyces floscopae	*Floscopa peruviana*	Brazil	[102]
Uromyces fontii	*Peplis acutangula*	Morocco	[510]
Uromyces foveolatus	*Bauhinia hirsuta* and *B. mirandina*	Brazil	[102]
Uromyces fuscatus	*Polygonum alpinum*	Idaho and Utah	[281]
Uromyces fusisporus	*Acacia neriifolia* and *A. salicina*	Australia	[177]
Uromyces fremonti	*Oenothera fremontii*	Kansas	[79]

Table 4. *Cont.*

Uromyces Species	Host	Country	Reference
Uromyces galactiae	*Galactia pedunculata*	Brazil	[517]
Uromyces galii	*Galium aparine* and *G. spurium*	Japan	[222]
Uromyces galii-californici	*Galium californicum* and *Galium* sp.	California	[520]
Uromyces galphimiae	*Galphimia glauca* and *G. humboldtiana*	México	[456]
Uromyces garanbiensis	*Ehretia dicksonii*	Taiwan	[521]
Uromyces gaubae	*Caltha introloba*	Australia	[522]
Uromyces gausseni	*Dorycnopsis gerardii*	France	[516]
Uromyces geissorhizae	*Geissorhiza* sp.	Western Cape Province	[523]
Uromyces geraniicola	*Geranium patagonicum*	Chile	[240]
Uromyces gigantiformis	*Bidens* sp.	Colombia	[423]
Uromyces globosus	*Sapium* spp.	México	[103]
Uromyces gnaphalii	*Gnaphalium* sp.	Colorado	[388]
Uromyces goyazensis	*Bauhinia* sp.	Brazil	[538]
Uromyces grandiotii	*Ancrumia cuspidata*	Chile	[540]
Uromyces greenstockii	*Ipomoea greenstockii*	South Africa	[138]
Uromyces guayacuru	*Statice brasiliensis*	Buenos Aires	[542]
Uromyces habrochloae	*Habrochloabul lockii*	Malawi	[244]
Uromyces hainanicus	*Ipomoea sumatrana*	China	[319]
Uromyces handelii	*Lotus gebelia*	Iraq	[220]
Uromyces hardenbergiae	*Hardenbergia monophylla*	Australia	[280]
Uromyces hawksworthii	*Phthirusa stelis*	Brazil	[60]
Uromyces heimii	*Medicago arborea*	France	[516]
Uromyces hellebori-thibetani	*Helleborus thibetanus*	China	[195]
Uromyces hessii	*Zantedeschia angustiloba*	Angola	[558]
Uromyces heterantherae	*Heteranthera reniformis*	Brazil	[102]
Uromyces heterogeneus	*Hibiscus syriacus*	India	[126]
Uromyces heteromallus	*Haloxylon recurvum*	Pakistan	[563]
Uromyces hewittiae	*Hewittia bicolor*	Philippines	[565]
Uromyces hidakaensis	*Pisum sativum*	Japan	[222]
Uromyces himalaicus	*Lilium* sp.	Nepal	[567]
Uromyces holubii	*Dracaena* sp.	Gauteng	[573]
Uromyces huallagensis	*Desmodium* sp.	Peru	[575]
Uromyces hyderabadensis	*Atylosia scarabaeoides*	India	[579]
Uromyces hydrocotylicola	*Hydrocotyle* sp.	China	[96]
Uromyces hypericinus	*Hypericum brasiliense*	Formosa	[180]
Uromyces hypsophilus	*Euphorbia* sp.	Mendoza	[391]
Uromyces indicus	*Sporobolus indicus*	Barbados	[589]
Uromyces infarctus	*Cayaponia* sp.	Costa Rica	[127]
Uromyces inflatus	*Anisotome* sp.	New Zealand	[591]
Uromyces ingicola	*Inga* sp.	Amazonas	[575]

Table 4. *Cont.*

Uromyces Species	Host	Country	Reference
Uromyces ingiphilus	*Inga edulis*	Argentina	[592]
Uromyces insignis	*Echinocephalum latifolium* and *Melanthera latifolia*	Brazil	[219]
Uromyces insularis	*Clitoria cajanifolia*	Puerto Rico	[466]
Uromyces invisus	*Solanum sisymbriifolium*	Argentina	[415]
Uromyces ipatingae	*Clitoria fairchildiana*	Brazil	[219]
Uromyces isachnes	*Isathne kunthiana*	Sri Lanka	[594]
Uromyces jatrophicola	*Cnidoscolus* sp. and *Jatropha* sp.	Brazil	[103]
Uromyces juncicola	*Juncus stipulatus*	Mendoza	[180]
Uromyces johowii	*Vicia macraei*, *V. nigricans*, and *Vicia* sp.	Chile	[282]
Uromyces kentaniensis	*Antholyza aethiopica* and *Chasmanthe aethiopica*	South Africa	[322]
Uromyces kigesianus	*Pittosporum abyssinicum*	Uganda	[609]
Uromyces kochianus	*Geranium nodosum*	Switzerland	[611]
Uromyces koeleriae	*Koeleria caucasica*	Russia	[106]
Uromyces krantzbergensis	*Anthericum* sp.	Namibia	[138]
Uromyces kurtzii	*Senecio* spp.	Argentina	[415]
Uromyces kwangensis	*Justicia* sp.	Congo	[218]
Uromyces langtangensis	*Anaphalis nepalensis*	Nepal	[463]
Uromyces largus	*Chamaesyce lata*	Colorado	[87,88]
Uromyces sp.	*Lasiocorys abyssinica*	Eritrea	[287]
Uromyces latimammatus	*Ipomoea sumatrana*	China	[621]
Uromyces leonotidis	*Leonotis nepetifolia*	India	[75]
Uromyces lereddei	*Colutea arborescens*	France	[220]
Uromyces lespedezae	*Lespedeza capitata*	Vermont	[583]
Uromyces lespedezae-bicoloris	*Lespedeza bicolor* and *L. formosa*	China	[108,109]
Uromyces lespedezae-macrocarpae	*Campylotropis macrocarpa*, *Lespedeza bicolor*, and *L. formosa*	China	[108,109]
Uromyces lespedezae-sericeae	*Lespedeza sericea*	Pakistan	[208]
Uromyces libycus	*Lotus pusillus*	Libya	[197]
Uromyces lomandracearum	*Lomandra longifolia*	Australia	[62]
Uromyces loranthi	*Loranthus* sp.	Brazil	[376]
Uromyces lotononidicola	*Lotononis cytisoides*	South Africa	[632]
Uromyces lygei	*Lygeum spartum*	Sardegna	[325]
Uromyces macnabbii	*Chionochloa* spp. and *Danthonia* spp.	New Zealand	[591]
Uromyces mangenotii	*Vicia pubescens*	France	[516]
Uromyces manihoticola	*Manihot* spp.	Brazil	[103]
Uromyces manihotis-catingae	*Manihot* spp.	Brazil	[102]
Uromyces marinus	*Medicago marina*	Morocco	[220]
Uromyces martinii	*Melanthera* spp. and *Bidens* spp.	Florida	[262]
Uromyces massoniae	*Massonia latifolia*	South Africa	[138]
Uromyces megalosporus	*Tessaria absinthioides*	Tucumán	[371]

Table 4. *Cont.*

Uromyces Species	Host	Country	Reference
Uromyces melandrii	*Melandrium cucubaloides*	Los Lagos	[162]
Uromyces melasphaerulae	*Melasphaerula graminea*	Western Cape Province	[424]
Uromyces melothriae	*Melothria tomentosa*	Eritrea	[287]
Uromyces meygounensis	*Euphorbia bungei*	Iran	[638]
Uromyces miersiae	*Miersia chilensis*	Chile	[540]
Uromyces mikaniae	*Mikania* sp.	Brazil	[219]
Uromyces mimusops	*Mimusops* sp.	South Africa	[700]
Uromyces moehringiae	*Moehringia lateriflora*	Japan	[297]
Uromyces mongolicus	*Euphorbia kozlovii*	Mongolia	[535]
Uromyces montis-ferrati	*Euphorbia luteola*	Northern Africa	[649]
Uromyces moraeae	*Moraea spathacea*	South Africa	[144]
Uromyces mussooriensis	*Stipa sibirica*	India	[106]
Uromyces myosotidis	*Myosotis* sp.	Turkey	[470]
Uromyces myristicus	*Euphorbia bicolor*	Texas	[657]
Uromyces namaqualandus	*Roepera cordifolia*	Namibia	[384]
Uromyces nassauviae	*Nassauvia lagascae*	Argentina	[415]
Uromyces nassellae	*Nassell apubiflora*	Bolivia	[106]
Uromyces natricis	*Ononis rotundifolia*	France	[342]
Uromyces nattrassii	*Statice spicata*	Cyprus	[350]
Uromyces naucinus	*Cayaponia* sp.	Ecuador	[127]
Uromyces nevadensis	*Primula suffrutescens*	California	[78]
Uromyces notabilis	*Cyperus* sp. and *Kyllinga* sp.	Uganda	[487]
Uromyces nothoscordi	*Nothoscordum striatum*	Texas	[660]
Uromyces numidicus	*Geranium atlanticum*	Northern Africa	[649]
Uromyces nymphoidis	*Nymphoides peltata*	Romania	[228]
Uromyces oberwinklerianus	*Acalypha* sp.	Costa Rica	[310]
Uromyces oblectaneus	*Rhynchospora corymbosa* and *R. exaltata*	Brazil	[219]
Uromyces obscurus	*Phaseolus* sp.	México	[456]
Uromyces ocimi	*Ocimum menthifolium*	Uganda	[168]
Uromyces oedipus	*Sophora japonica*	Japan	[665]
Uromyces oenotherae	*Oenothera linifolia*	Illinois	[582]
Uromyces oliveirae	*Bellevalia eigii*	Israel	[390]
Uromyces ophiorrhizae	*Ophiorrhiza longiflora*	Indonesia	[309]
Uromyces orchidearum	*Chiloglottis* spp.	Australia	[268]
Uromyces ornatipes	*Phrygilanthus sonorae*	México	[15]
Uromyces ornithopodioides	*Ornithopus isthmocarpus* and *O. compressus*	Portugal	[317]
Uromyces orthosiphonis	*Orthosiphon glabratus*	India	[152]
Uromyces otakou	*Poa* spp.	New Zealand	[591]
Uromyces otaviensis	*Ipomoea verbascoidea*	Namibia	[385]
Uromyces ovalis	*Leersia oryzoides*	Japan	[671]

Table 4. *Cont.*

Uromyces Species	Host	Country	Reference
Uromyces ovirensis	*Primula wulfeniana*	Austria	[672]
Uromyces pannosus	*Bauhinia candicans*	Brazil	[216]
Uromyces papillatus	*Heteromorpha arborescens*	South Africa	[137]
Uromyces parilis	*Rumex occultans*	Israel	[81]
Uromyces paspalicola	*Paspalum racemosum*	Ecuador	[294]
Uromyces pavgii	*Achyranthes aspera*	India	[677]
Uromyces pavoniae	*Pavonia racemosa*	Puerto Rico	[259]
Uromyces pazschkeanus	*Vigna* sp.	Eritrea	[287]
Uromyces penniseti	*Pennisetum lanatum*	Pakistan	[536,679]
Uromyces pentaceae	*Pentace burmanica*	India	[680]
Uromyces pentaschistidis	*Pentaschistis airoides*	South Africa	[243]
Uromyces peraffinis	*Bauhinia* sp.	Brazil	[219]
Uromyces perlebiae	*Bauhinia* spp.	Brazil	[102]
Uromyces phalaridicola	*Phalaris minor*	Turkmenistan	[106]
Uromyces phaseolicola	*Phaseolus prostratus*	Argentina	[126]
Uromyces phlogacanthi	*Phlogacanthus celebicus*	Indonesia	[309]
Uromyces phtirusae	*Phthirusa pyrifolia*	Colombia	[15]
Uromyces phyllachoroides	*Cynosurus elegans*	Tunisia	[684]
Uromyces physanthyllidis	*Physanthyllis tetraphylla*	Greece	[544]
Uromyces pittospori	*Pittosporum abyssinicum*	Eritrea	[287]
Uromyces planiusculus	*Rumex frutescens*	Tristan da Cunha	[688]
Uromyces plantaginis	*Plantago barbata* and *P. tubulosa*	Argentina	[415]
Uromyces poiretiae	*Poiretia scandens*	Venezuela	[431]
Uromyces polemanniae	*Polemannia* spp.	South Africa	[142]
Uromyces poliotelis	*Anguria* sp., *Gurania* sp. and *Selysia prunifera*	Costa Rica	[127]
Uromyces politus	*Muehlenbeckia cunninghamii*	Australia	[343]
Uromyces polygoni-avicularis	*Polygonum nepalense*	Nepal	[693]
Uromyces polytriadicola	*Polytrias amaura*	Philippines	[232]
Uromyces poonensis	*Sesbania aegyptiaca*, *S. grandiflora*, and *S. sesban*	India	[357]
Uromyces porcensis	*Inga ingoides*	Colombia	[226]
Uromyces porosus	*Vicia americana* and *V. sparsifolia*	Iowa	[155]
Uromyces pozoae	*Pozoa hydrocotylifolia*	Chile	[240]
Uromyces pratensis	*Poa pratensis*, *Ranunculus auricomus*, and *R. cassubicus*	Finland	[329]
Uromyces prismaticus	*Secale montanum*	Iran	[320]
Uromyces procerus	*Festuca procera*	Chile	[240]
Uromyces pseudarthriae	*Pseudarthria robusta*	South Africa	[700]
Uromyces psychotriae	*Psychotria* sp.	Brazil	[219]
Uromyces pulvinatus	*Euphorbia inaequilatera*	South Africa	[702]
Uromyces quaggafonteinus	*Ehrharta calycina*	South Africa	[429]

Table 4. *Cont.*

Uromyces Species	Host	Country	Reference
Uromyces ramacharii	*Ocimum* sp.	India	[706]
Uromyces rapaneae	*Rapanea* sp.	São Paulo	[450]
Uromyces ratoides	*Cayaponia* sp.	Ecuador	[212]
Uromyces ratus	*Cayaponia* spp.	Brazil	[212]
Uromyces rayssiae	*Scilla hyacinthoides*	Israel	[390]
Uromyces rebeccae	*Suaeda californica*	California	[47]
Uromyces regius	*Bauhinia candicans*	Brazil	[219]
Uromyces reichei	*Milla bivalvis* and *Triteleia gaudichaudiana*	Chile	[415]
Uromyces reichertii	*Scilla hyacinthoides* and *Hordeum bulbosum*	Israel	[81]
Uromyces reynoldsii	*Modeccabracteata* and *Trichosanthes* spp.	Myanmar	[212]
Uromyces riloensis	*Doronicum cordifolium*	Bulgaria	[82]
Uromyces rostratus	*Eriosema* sp.	Rio de Janeiro	[331]
Uromyces rubidus	*Andropogon condensatus*	Brazil	[199]
Uromyces rugosus	*Lupinus* sp.	México	[398]
Uromyces rugulosus	*Campylotropis* spp. and *Lespedeza* spp.	China	[96]
Uromyces ruiz-leali	*Anarthrophyllum elegans*	Argentina	[415]
Uromyces rzedowskii	*Ledenbergia macrantha*	México	[292]
Uromyces sakawensis	*Solidago virgaurea*	Japan	[711]
Uromyces sasaensis	*Valerianakilimandscharica* and *V. volkensii*	Uganda	[712]
Uromyces satarensis	*Blainville acmella* and *B. latifolia*	China and India	[319]
Uromyces saulensis	*Selysia prunifera*	France	[127]
Uromyces scaberulus	*Lespedeza bicolor*, *L. cuneate*, *L. cyrtobotrya*, and *L. formosa*	China	[156]
Uromyces scirpinus	*Scirpus supinus*	Philippines	[232]
Uromyces secamones	*Secamone platystigma*	Uganda	[168]
Uromyces sedi	*Sedum anacampseros*	France	[717]
Uromyces seligeri	*Lathyrus grandiflorus* and *L. sylvestris*	Greece and Russia	[421]
Uromyces sellierae	*Selliera radicans*	New Zealand	[67]
Uromyces semnanensis	*Astragalus fridae*	Iran	[276]
Uromyces senecionicola	*Cacalia* sp. and *Senecio roldana*	México	[292]
Uromyces senecionis-gigantis	*Senecio gigas*	Ethiopia	[719]
Uromyces seselis	*Seseli tortuosum*	Portugal	[722]
Uromyces sesseae	*Sessea* sp.	Ecuador	[325]
Uromyces shahrudensis	*Onobrychis* sp.	Iran	[723]
Uromyces shikokianus	*Cladrastis platycarpa* and *C. shikokiana*	Japan	[222]
Uromyces silenes-chloraefoliae	*Silene chlorifolia*	Iran	[320]
Uromyces silksvleyensis	*Bartholina burmanniana*	Western Cape and South Africa	[378]
Uromyces simulans	*Vilfa* sp.	Colorado	[724]
Uromyces siphocampyli-gigantei	*Siphocampylus giganteus*	Ecuador	[725]
Uromyces smilacis	*Smilax* sp.	Colombia	[227]
Uromyces snowdeniae	*Snowdenia scabra*	Kenya	[140]

Table 4. *Cont.*

Uromyces Species	Host	Country	Reference
Uromyces solariae	*Solaria miersioides*	Chile	[240]
Uromyces solidaginis-caricis	*Carex varia*	Indiana	[728]
Uromyces solidus	*Desmodium strictum*	North Carolina	[657]
Uromyces sonorensis	*Merremia palmeri*	México	[729]
Uromyces sophorae-japonicae	*Sophora japonica*	Japan	[92]
Uromyces sophorae-viciifoliae	*Sophora viciifolia*	China	[732]
Uromyces sparaxidis	*Sparaxis lineata* and *S. tricolor*	South Africa	[142]
Uromyces sphaericus	*Perymenium ecuadoricum*	Ecuador	[210]
Uromyces sphaerophysae	*Swainsona salsula*	China	[198]
Uromyces splendens	*Astragalus oroboides*	Norway	[735]
Uromyces sporoboloides	*Sporobolus berteroanus*	Ecuador	[737]
Uromyces standleyanus	*Gaudichaudia schiedeana*	El Salvador	[301]
Uromyces statices	*Statice* sp.	California	[598]
Uromyces statices-mucronatae	*Statice mucronata*	Morocco	[279]
Uromyces steironematis	*Spartina michauxiana*	Nebraska	[738]
Uromyces stellariae	*Stellaria kotschyana*	Iran	[739]
Uromyces stellariae-saxatilis	*Stellaria media*, *S. saxatilis*, and *S. vestita*	China	[96]
Uromyces stenorrhynchi	*Stenorrhynchus* sp.	Peru	[740]
Uromyces stipinus	*Stipa rubens*	Russia	[106]
Uromyces strauchii	*Clutia daphnoides*	Southern Africa	[138]
Uromyces struthanthi	*Struthanthus* sp.	Panama	[15]
Uromyces substriatus	*Lupinus argenteus*	Montana	[79]
Uromyces superstomatalis	*Cayaponia rigida*	France	[127]
Uromyces tarapotensis	*Camptosema* sp.	Peru	[575]
Uromyces teheranicus	*Trifolium retense*	Iran	[744]
Uromyces tehuelches	*Alstroemeria patagonica*	Argentina	[167]
Uromyces tener	*Manettia gracilis*	Brazil	[219]
Uromyces tepicensis	*Loeselia amplectens*	México	[292]
Uromyces thelymitrae	*Thelymitra antennifera* and *T. flexuosa*	Australia	[81]
Uromyces thermopsidicola	*Thermopsis chinensis*	Japan	[222]
Uromyces tolerandus	*Manihot esculenta*	Brazil	[219]
Uromyces tomentellus	*Leguminosae* sp.	California	[747]
Uromyces tosensis	*Commelina communis*	Japan	[711]
Uromyces tournefortiae	*Tournefortia* sp.	Brazil	[600]
Uromyces transcaspicus	*Astragalus angustidens*	Turkmenistan	[748]
Uromyces traucoensis	*Selliera radicans*	Chile	[749]
Uromyces triandrae	*Themeda triandra*	India	[669]
Uromyces trichoclines	*Trichocline polymorpha*	Brazil	[219]
Uromyces tricholenae	*Tricholaena rosea*	Dominican Republic	[750]
Uromyces tricorynes	*Tricoryne elatior*	Australia	[245]
Uromyces trigonellae-occultae	*Trigonella occulta*	Egypt	[752]

Table 4. *Cont.*

Uromyces Species	Host	Country	Reference
Uromyces tripogonicola	*Tripogon lisboae*	Maharashtra	[753]
Uromyces triteleiae	*Brodiaea porrifolia*, *Leucocoryne alliacea*, and *Triteleia porrifolia*	Chile	[415]
Uromyces trollipii	*Roepera foetida* and *Zygophyllum foetidum*	South Africa	[385]
Uromyces truncatulus	*Geranium versicolor*	Greece	[421]
Uromyces tulipae	*Tulipa edulis*	Japan	[756]
Uromyces tungurahuensis	*Aspilia lanceolata*	Ecuador	[757]
Uromyces uleanus	*Euphorbia* sp.	Brazil	[219]
Uromyces umiamensis	*Cucumis* sp. and *Momordica cochinchinensis*	India	[127]
Uromyces undulatoparietis	*Ligularia hookeri*	China	[108,109]
Uromyces unioniensis	*Desmodium* sp. and *Meibomia* sp.	Brazil	[394]
Uromyces unitus	On living leaves of *Calandrinia leeana*	Washington	[758]
Uromyces urariae	*Uraria lagopodioides*	China	[759]
Uromyces urgineae	*Urginea indica*	India	[397]
Uromyces valerianae-microphyllae	*Valeriana microphylla*	Ecuador	[766]
Uromyces vankyorum	*Atriplex lampa*	Argentina	[282]
Uromyces venustus	*Cestrum nitidum*	México	[375]
Uromyces verus	*Bauhinia rufa*	Brazil	[100]
Uromyces vesiculosus	*Zygophyllum* spp.	Australia	[245]
Uromyces viciae-unijugae	*Vicia unijuga*	Japan	[92]
Uromyces vicinus	*Ipomoea* sp.	Brazil	[219]
Uromyces vicosensis	*Bauhinia* sp.	Brazil	[219]
Uromyces viegasii	*Bauhinia forficata* and *Bauhinia* sp.	Brazil	[219]
Uromyces viennot-bourginii	*Bellevalia eigii* and *Hordeum spontaneum*	Israel	[81]
Uromyces vignae-luteolae	*Vigna luteola*	Congo	[610]
Uromyces visci	*Viscum congolense*	Rwanda	[551]
Uromyces volkartii	*Trisetum flavescens*	Switzerland	[770]
Uromyces vulpiae	*Vulpia broteri*	Portugal	[722]
Uromyces waipoua	*Hypericum gramineum* and *H. japonicum*	New Zealand	[313]
Uromyces wedeliae-biflorae	*Wedelia biflora*	Indonesia	[309]
Uromyces wellingtonicus	*Sporobolus indicus*	India	[629]
Uromyces wolfii	*Borreria laevis*	Venezuela	[609]
Uromyces wulffiae	*Wulffia baccata*, *W. maculata*, *W. scandens*, and *W. stenoglossa*	Brazil	[219]
Uromyces yoshinagae	*Pisum sativum*	Honshu	[360]
Uromyces zeyheri	*Ixia scillaris*, *I. scillaris*, and *Tritonia pallida*	South Africa	[123]
Uromyces zigadeni	*Zigadenus paniculatus*	Utah	[328]
Uromyces zizaniae-latifoliae	*Zizania latifolia*	Taiwan	[773]

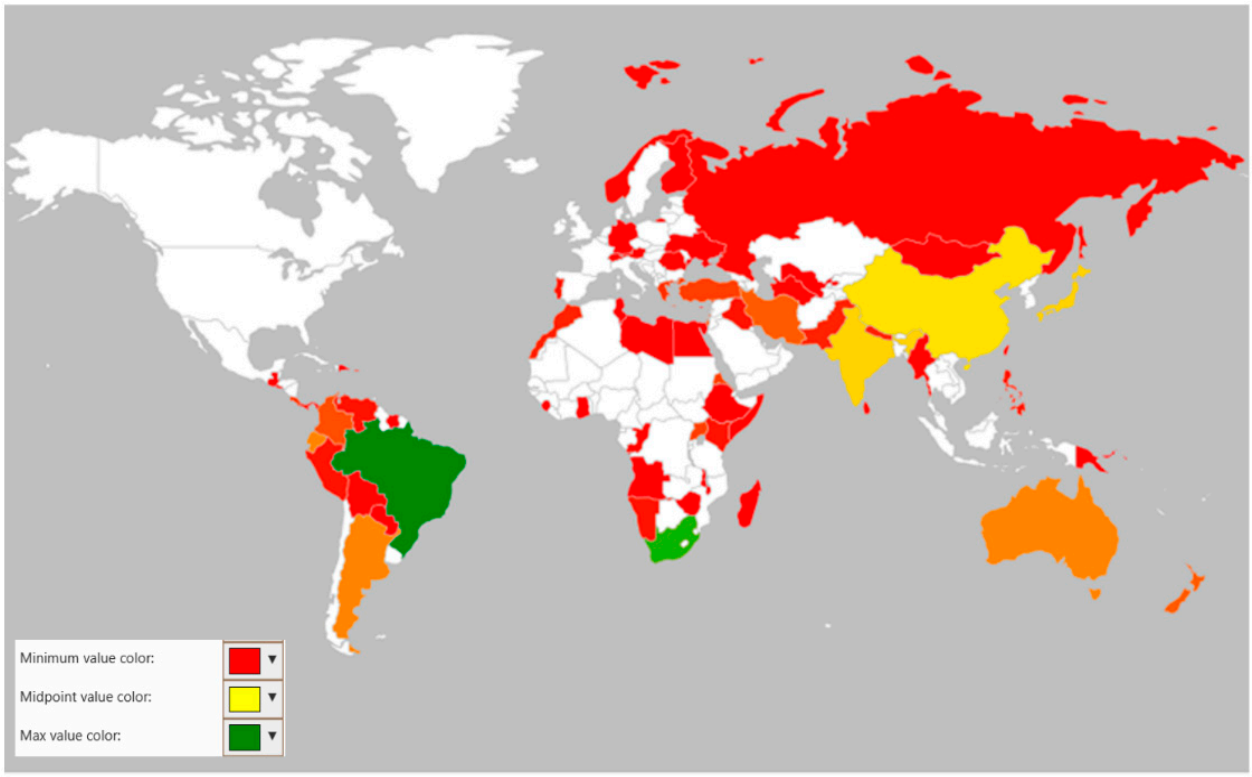

Figure 9. Geographical heat map showing distribution of endemic/native *Uromyces* species.

6. Discussion

Uromyces is the second-largest rust genus, the species of which are phytopathogenic to any category of plants, causing severe damage and reducing growth and yields. The present study provides literature-based complete information on this rust in a single compilation. In addition to being distributed worldwide on vascular plants, *Uromyces* species cause several damaging diseases on major agricultural crops such as alfalfa (*Medicago sativa*), bean (*Phaseolus vulgaris*), carnation (*Dianthus caryophyllus*), chickpea (*Cicer arietinum*), clover (*Trifolium* sp.), and pea (*Pisum sativum*). This study contributes to a better understanding of the taxonomy of these rust fungi in terms of their taxonomic placement, biology, pathogenicity, life cycle, diversity, and distribution. The information presented in this study helps to better understand all possible aspects of *Uromyces* in a single document.

The genus *Uromyces* is distributed globally on around 647 plant genera belonging to 95 plant families. *Poaceae* and Fabaceae are the most affected families, with the occurrence of more than 100 species of *Uromyces*. However, these fungi infect about 95 species; their occurrence on *Poaceae* and *Fabaceae* reflects the specificity of these rusts to grasses and legumes. In addition to host diversity, the distribution of species of *Uromyces* exhibited a wide range across the globe. The distribution of this genus extends to over 150 countries, territories, and occupancies of the world. In its continental diversity distribution, North America is followed by Asia, Europe, South America, Africa, and Oceania, respectively. A large variation in the geographical distribution along with the vast diversity of hosts demonstrated the impact of significantly changing climatic zones on rust fungi. Besides this, more than 400 *Uromyces* species are endemic to more than 100 countries, provinces, and islands. This may be due to the climatic conditions and precise distribution of hosts. Available studies on global diversity and distribution are rare; however, regional descriptions are available. A checklist of rust fungi of New Zealand provided by Mckenzie [313] reported the occurrence of 31 species of *Uromyces*. Similarly, Bahcecioglu and Kabaktepe [80] reported 74 species from Turkey, while Afshan and Khalid [536] reported 15 species of the grass family *Poaceae* from Pakistan. In India, 97 species of *Uromyces* have been reported on various hosts [75].

A total of 61 *Uromyces* species were reported from Portugal, whereas about 91 were from Iran [430]. The occurrence of species of *Uromyces* reported from different countries also supports the broad diversity of these fungi on a wide range of hosts.

Although 988 species of *Uromyces* investigated in the present study are found all over the world, only 73 species are known to have DNA sequence data. As in the case of other rust fungi, the species of *Uromyces* are also difficult to culture, which may be one of the major factors behind the reduced availability of molecular data. In addition, the isolation of DNA directly from rust fungi present on a natural host and then its sequencing is not simple or easy, which also affects the molecular studies of these fungi. Phylogenetic studies based on LSU and ITS sequence data revealed that *Uromyces* species are polyphyletic taxa and required more DNA-based analyses for a better understanding of their taxonomic placement. The polyphyletic nature of *Uromyces* species was also confirmed by Aime and McTaggart [5] in their study to propose a higher ranking classification for rust fungi, with notes on genera. Similarly, this was also proposed by Gautam et al. [34] during their study on Indian *Pucciniales* with the description of the taxonomic outline, including important descriptive notes. Overall, the present study proposes the requirement of fresh collections of *Uromyces* species and their molecular characterization to generate molecular data so that their phylogenetic relationships can be explained more precisely. The development of a universal digital platform exclusively for global rust fungi should be developed for the benefit of researchers working on this specific group of fungi.

7. Conclusions

Being the second-largest plant pathogenic rust genus, *Uromyces* showed a great variation with respect to its diversity and distribution. After a complete analysis of information gathered in the present study, it was concluded that the species of rust genus *Uromyces* are distributed globally. Their distribution has been reported in over 150 countries and territories or occupancies of the world. However, the genus *Uromyces* predominantly showed its great diversity in North America in comparison to other continents. Approximately 647 plant genera belonging to 95 plant families are reported to be affected by these rust pathogens. Apart from this, the endemic nature of this genus is also revealed, which concluded that more than 400 species of *Uormyces* are found to be endemic in more than 100 countries. The biocontrol nature of some species of *Uormyces* is also elucidated in this study. Moreover, analyses of LSU and ITS sequence data revealed the polyphyletic nature of species of *Uromyces*. Further DNA-based analyses of rust disease caused by *Uromyces* are still required to develop a better understanding of their taxonomic placement.

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