

THE ERYSIPHACEAE OF KANSAS

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by

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## INTRODUCTION

The Erysiphaceae are pyrenomycetes of the order Erysiphales. Obligate parasites of Angiosperms, they exhibit a wide host range of approximately 1300 species, the majority being cultivated vascular plants.

Classification of the Erysiphaceae began with Linnaeus (1753). In "Species Plantarum" he made note of Mucor Erysiphe, listing several species on which it had been observed. Many species were subsequently noted and described. The descriptions were superficial and were named for the plant on which they were found to occur.

This method of classification was used until Wallroth (1819) introduced the concept that one species could occur on more than a single host species. He contended that classification should be made on the basis of the various shapes of the appendages and the modes of branching of the appendages.

A paper by Schlechtendahl (1819) published immediately following Wallroth's noted that division of the group could be made on the basis of the asci; some cleistothecia containing a single 8-spored ascus, and others containing several asci.

The observations made by Wallroth (1819) and Schlechtendahl (1819) established the method for subsequent classification based on structural characteristics.

A host oriented key to the Erysiphaceae is presented in this work. In addition to the host species that have been observed as infected, it includes cultivated and natural species capable of growing in this climatic range that are known to be parasitized by members of the Erysiphaceae.

## LITERATURE REVIEW

Several regional reports on Erysiphaceae were written in the years following the papers of Wallroth (1819) and Schlechtendahl (1819). They were based on the concepts in these papers and introduced no new criteria for classification.

Schweinitz (1834) published an account of the North American forms in which he described 16 new species. Later study determined that many of these were the same species on different hosts.

Leveille (1851) published a monograph "Organisation et Disposition methodique des especes que composent le genre Erysiphe". He divided the Erysiphaceae into two groups: Sporangium unicum, in which he placed the genera Podosphaera, and Sphaerotheca as having single asci, and Sporangium plurima with the genera Phyllactinia, Uncinula, Calocladia, and Erysiphe as having multiple asci. The genera within the two groups were established on the basis of the structure of the appendages.

The Tulasne brothers described and illustrated 16 species in the first volume of the "Selecta Fungorum Carpologia" (1861). The recognition of only 16 species and one genus, Erysiphe, was a step backward for classification, but the work is notable for the excellent illustrations of both conidial and cleistothecial forms.

In 1870 De Bary published "Beitrage zur Morphologie und Physiologie der Pilze". It was the first published work on the life history of the Erysiphaceae, and the development of the cleistothecia was described in detail. In classifying the group he established two genera, Podosphaera and Erysiphe, on the basis of single and multiple asci.

Cooke and Peck published two papers on the Erysiphaceae of the United States in 1872. In these papers they named several new species, 7 of which were later retained by Salmon (1900).

Burrill and Earle (1887) published "Parasitic Fungi of Illinois, Part 2, Erysiphaceae". They listed 28 species, employing a broad delimitation for each of the species and a notation of the hosts for each of the species.

Palla (1899) noted that Phyllactinia produces haustoria from hyphae which extrude through the stomata of the host plant. This provided the basis for the sub-family divisions of the group into Erysipheae and Phyllactineae.

The first major work on the Erysiphaceae was published by Salmon in 1900. The system of classification used by Salmon was based on hyphal and cleistothecial characteristics. While noting the character of the conidial stage of the group, he did not consider conidial characteristics reliable enough to be used as criteria in establishing species.

Under his method of classification he retained the two sub-families Erysipheae and Phyllactineae. Erysiphe, Sphaerotheca, Podosphaera, Uncinula, Microsphaera, and Phyllactinia were recognized as genera under which he listed a total of 60 species and varieties.

In 1905, Salmon observed that Erysiphe taurica was endophytic in its conidial stage. He renamed it Oidiopsis taurica and placed it in a new sub-family, Oidiopsidae.

Arnaud (1921) transferred the species Oidiopsis taurica in the sub-family Oidiopsidae to the species Leveillula taurica in the sub-family Leveilluleae.

Regional works followed by Klika (1924), Jorstad (1925), Skoric (1927), and Sawada (1927), all of which utilized the classification system of