

TAXONOMIC STUDY OF RUST FLORA
OF NORTHERN AREAS OF PAKISTAN

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DOCTOR OF PHILOSOPHY

IN

BOTANY

BY

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CERTIFICATE

This is to certify that the research work described in this thesis entitled “Taxonomic study of Rust flora of Northern Areas of Pakistan” by Mr. Muhammad Asim Sultan is the original work and has been carried out under our supervision. We have gone through all the data/results/materials reported in the manuscript and certify their correctness/authenticity. We further certify that the material included in this thesis has not been used in part or full in a manuscript already submitted or in the process of submission in partial/complete fulfillment of the award of any other degree from any other institution. We also certify that the thesis has been prepared under our supervision according to the prescribed format and we endorse its evaluation for the award of Ph.D. degree through the official procedure of the University.

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SUMMARY

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In the present study 36 taxa of the rust fungi are described and illustrated from Northern areas of Pakistan. Among these *Phragmidium artemisiae*, *Puccinia potentillidis-argentatae*, *Uromyces hedyaridis-falconeri*, *Aecidium cheilanthae*, *A. circii*, *A. danyorensis*, *A. ikramii*, *A. pakistanicum*, *A. ribidis-orientalae* and *A. veronicaedis-persicae* are new to science.

Occurrence of a *Phragmidium* sp. on a member of the family *Asteraceae* is being reported for the first time. Uredinales viz. *Melampsora chelidonii-pierotii* and *Puccinia arthraxonis-ciliaris* are new records from Pakistan.

The state I of *Phragmidium bulbosum* on *Rubus ulmifolius*, *Phragmidium mysorensense* on *Rubus niveus*, *Puccinia pimpinellae* on *Pimpinella diversifolia*, state II of *Puccinia ambigua* on *Galium aparine* and state III of *Puccinia sonchi* on *Sonchus* sp. have not been collected previously from Pakistan.

In addition, *Salix flabellaris* for *Melampsora epitea*, *Polygonum plebejum* for *Uromyces polygoni-aviculariae* and *Adiantum venustum* for *Uredo capilli-veneris* are new hosts for these rust fungi.

The remaining rust taxa viz *Coleosporium lycopi*, *Phragmidium rosae-moschatae*, *Phragmidium tuberculatum*, *Puccinia argentata*, *Puccinia coronata*, *Puccinia garaminis*, *Puccinia komarovii*, *Puccinia menthae*, *Puccinia nitidula*, *Puccinia nepalensis*, *Puccinia taraxaci*, *Aecidium clematidis* and *Aecidium montanum* have already been reported from different areas of Pakistan. However these are reported for the first time from Northern areas.

Hyalopsora polypodii, *Peridermium sp.* and *Gymnosporangium clavariaeforme* though reported by earlier workers have been described and illustrated to represent the spectrum of rust flora of Northern Areas of Pakistan.