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SPECIES DIVERSITY OF PUCCINIA PARASITIC ON PLANT FAMILY OF POACEAE IN NORTH-EASTERN OF UZBEKISTAN

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Abstract:
The article provides information about 15 species of the Puccini family distributed in 25 species of plants of the Poaceae family distributed in the North-Eastern region of Uzbekistan.

Keywords: North-Eastern, Poaceae, Puccini, Puccinia bromina.

Introduction

Poaceae - Plants of the Poaceae family: includes monocotyledonous annuals, biennials, and perennial herbs, as well as some shrubs and trees. The stems of plants of the Poaceae family are cylindrical and grow sideways or upright. The height can be from 1 cm to 10 m. Its woody stems grow tall, sometimes up to 40 m. The leaves of the plant are arranged alternately and consist of simple, unbranched, fibrous leaves [1]. The flowers are mostly bisexual, and in some plant species they are unisexual, inconspicuous, small, collected in a simple inflorescence. In some cases, it forms complex flowers such as shingles and sedges. Fruits are grains, nuts, seeds, or berries. According to scientists, plants of the Poaceae family include 660 genera and more than 10,000 species [2]. 82 genera and more than 250 species are known in the territory of our republic. Most species of plants of the Poaceae family are widespread in almost all parts of the earth [3]. Representatives of this family are cultural crops of important importance for agriculture: wheat, barley, corn, white corn, rice, oats, rye, millet, and sugarcane plant, etc., are important in human life [4]. At the same time, there are wheat, buckwheat and other species that serve as fodder for farm animals.

Puccinia is the largest genus in the order Pucciniales, with about 3000~4000 described species. Species of Puccinia are especially important and widespread plant pathogens that have a major economic impact on world's cereal and agricultural crops. There are substantial gaps in the current knowledge of rust diversity status in Uzbekistan [5]. There is still no comprehensive study or even preliminary estimation about the number of Puccinia species and their effect on plants in Central Asia as a whole. According to the information provided by Uzbek scientists, 146 species of Puccinia have been studied in Uzbekistan, but scientific research on the diseases caused by Puccinia fungi and their diversity has not been carried out in our republic. Rust fungi in Ugom-Chotkal region and Zomin Nature Park were studied by Ghafarov and other scientists [6]. The most common type of rust in the foothills and mountain regions of the Fergana Valley, Chotkal and Kurama mountain ranges in Uzbekistan, many species of Puccinia are found on Poaceae plants. For this reason, it is necessary to carry out field research,

scientific and practical work in order to study the diseases caused by Puccinia species in the Western Tien-Shan Mountains [7]. As a result of the research, a database of Puccinia species of Poaceae plants in the Western Tien-Shan mountains will be formed.

Material and Methods

Consequently, this study aims to first, introduce our ongoing survey on this genus in the study area and then, primarily summarizes the results of previous studies in the region, with a special view on its Northeastern Uzbekistan. Puccinia species distributed in plants of the Poaceae family, distributed in the North-Eastern region of Uzbekistan, served as a source. Samples of plants infected with rust fungi were analyzed in the Mycological Laboratory of the Institute of Botany of the Federal Republic of Uzbekistan. At the same time, the herbarium materials stored in the fund of the Tashkent Mycological Herbarium (TASM) were re-examined. Morphological examinations were carried out using 300M (HDCE-X5) and N-MBI-15 biolam and trinocular microscopes. Also, methods such as observation, collection of samples, comparison, and collection of collections were used for research.

Results and Discussion

Here we have reported in total 15 species of Puccinia were found to be parasitic to 25 plant species belonging to 17 genera of Poaceae family in the study region. (table 1). The modern systematic nomenclature of the fungus under study is based on the website indexfungorum.org (Index Fungorum.) and the names of host plants powo.science.kew.org (Kew Science Plants of the World online).

Table 1. Found in plants of the Poaceae family in the northeastern region of Uzbekistan

Phylum	Class	Order	Family	Genus	Species
Basidiomycota	Pucciniomycetes	Pucciniales	Pucciniaceae	Puccinia	P. agropyri P. bromina P. coronate P. cynodontis P. dactylidina P. graminis P. hordei P. isiacae P. moriokaensis P. obtusata P. oryzopsidis P. persistens P. poarum P. rufipes P. triticina

The following Puccinia species were identified: P. agropyri (Agropyron badamense, Elytrigia repens, E. trichophora, Taeniatherum crinitum), P. bromina (Anisantha tectorum, Bromus tyttholepis, B. danthoniae, B. lanceolatus, B. oxyodon, Buglossa arvensis), P. coronata (Agrostis canina), P. cynodontis (Cynodon dactylon), P.

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dactylidina (Dactylis glomerata), P. graminis (Hordeum bulbosum, Elytrigia trichophora, Taeniatherum crinitum), P. hordei (Hordeum vulgare), P. isiacae (Phragmites australis), P. moriokaensis (Phragmites australis), P. obtusata (Saccharum spontaneum), P. oryzopsidis (Piptatherum kokanicum, P. vicarium), P. persistens (Agrostis gigantea, Elymus drobovii, Elytrigia repens, E. trichophora, Taeniatherum crinitum), P. poarum (Poa angustifolia, P. annua), P. rufipes (Imperata cylindrica), P. triticina (Triticum spp.). This work was supported by State Scientific and Technical Program of Institute of Botany of Uzbekistan Academy of Sciences, (2021-2024). You can see below (diagram 1) the distribution of species in the study area.

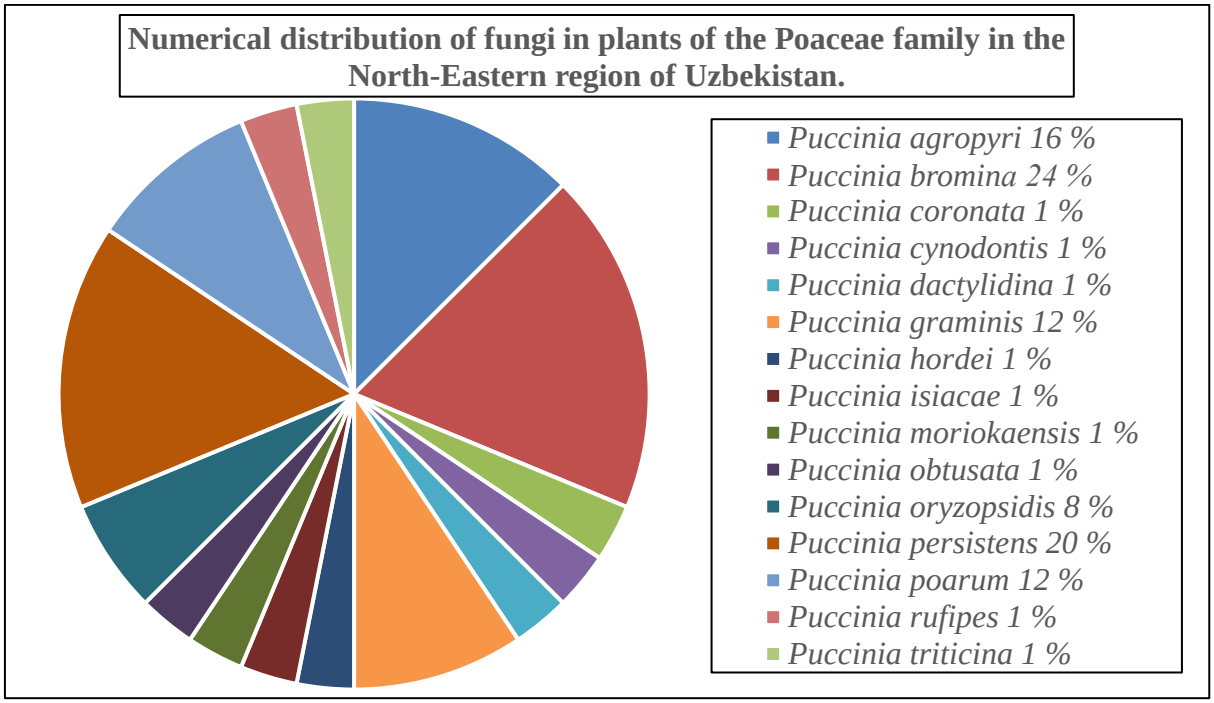

Diagram 1. Distribution of species in the study area

As can be seen from the table, it was found that among the 15 species of Puccinia fungi, the most damaging to plants of the Poaceae family in the northeastern region of Uzbekistan are Puccinia bromina – 24 %, Puccinia persistens – 20 %, Puccinia agropyri – 16 %.

Conclusion

P. bromina family made 24% and P. persistens (20 %) and P. agropyri (16 %) dominate the next places. The least common families are P. coronata, P. cynodontis, P. dactylida, P. hordei, P. isiacae, P. moriokaensis, P. obtusata, P. rufipes, P. triticina, which are very rare (1%). The conclusion is that such sharp differences in the distribution of species are inextricably linked to a number of factors (the area occupied by the host plant, the human factor, the climate factor, the soil factor, etc.).

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