

Avena L. In: Kole C. (ed.) Wild Crop Relatives: Genomic & Breeding Resources.
Cereals.

Devoted to Ken Frey – oat breeder

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Abstract

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The chapter presents the taxonomic position of species of the *Avena* genus. The geographical locations of genetic diversity and morphology of wild oat species are given in detail. Karyological and cytological problems related to the *Avena* genome structure are considered. Wild species of oat are characterized from the economic point of view. Various aspects of in situ and ex situ conservation of oat species diversity are discussed. It is stated that genetic erosion may reveal itself during germplasm conservation in a genebank and due to the shrinkage of this species habitat in the wild. Specific features of activities of the largest holders of wild *Avena* species and the work of international organizations coordinating said activities are presented. The role of wild species in elucidation of origin and evolution of various cultivated oat species is demonstrated and brief descriptions of the former provided. The problems of *Avena* species systematization using morphological characters are considered, various taxonomic systems presented and different approaches to the creation of such systems discussed. The results of wild oat species study and analysis applying different biochemical and molecular markers are offered. Various aspects of oat genetic collections utilization are discussed. Much attention is paid to the potential of *Avena* wild species and their challenges, approaches and successes in oat breeding.

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3.1 Introduction

Oat is one of the most important cereal crops in the world. The genus *Avena* L. includes cultivated species with different ploidy levels and a number of wild species reflecting a wide range of botanical and ecological diversity. A majority of these forms came from the centres of origin which by definition shows great diversity of *Avena* species. With this in view, oat species became the subject of investigations in order to specify the complex organization of the *Avena* genus, and indicate aspects of its evolution and phylogenetic links between the species.

Further search for agronomical traits and utilization of new oat breeding sources is very important for breeding purposes.

3.8 Concusions

There is considerable interest in extending the range of cultivated oat through the incorporation of genes from the wild oat species. A number of considered wild species are reflected in a wide range of botanic, ecological and genetic diversity. The results of presented researches of wild *Avena* species made it possible to display intraspecific diversity on all the characters involved. Numerous researches in this direction and practical results of oat breeding have evidenced that utilization of wild species is the most promising trend of oat breeding, capable of broadening genetic base and reducing genetic erosion of this crop.

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