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The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

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Ecotypic research and applied value of the forage germplasm resources

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Key words : forage , germplasm resources , ecotype , research , applied value

Introduction Ecotype is a common ecological term , which is used to describe intraspecific ecological differentiated flora . And it has already been adopted by plant taxonomy , systematics , physiology , genetics and related applied disciplines . It is important to know and grasp intraspecific gene type having different properties and value especially in collection , introduction , evaluation , genetic breeding and utilization of plant germplasm resources , and for understanding basic interspecific properties and utilizable value . This paper is a brief summary about the development of the ecotypic research , and its status and role in production and application , etc . The purpose is to show the importance and potential of conducting ecotypic research and application of forage germplasm resources .

Research summary and developmental tendency From 1922 to date , ecotypic research and application have a history of more than 80 years ; its development will be divided into three stages to be summarized in this paper . 1 . Early stage : From 1922 to the sixties , more than 30 years , scholars of the ecotypic research conducted much research on basic theories , research contents and methods , and the relationship of ecotypes with taxonomy and genetics . They made remarkable progress on the existent degree of ecotype , the difficulty degree of ecotype recognition , the discernable methods of ecotype , the taxonomic system of ecotype , etc . 2 . Middle stage : From the sixties to the middle of the seventies , ecologists conducted much research on phytoecology , systematics , genetics and other disciplines ; findings played an active role in the interpretation of the intraspecific fixed differentiation , adaptability , and interspecific genetic relationship . Basic theories were still developing , identified methods and technology were gradually improving , people were gradually paying attention to the ecotypic research in applied disciplines . 3 . Recent stage : The middle of seventies to date , research of ecotype and genotype increases in depth with a diversity of methods and technology . On the basis of traditional field identification , some physiology , biochemistry , genetic characteristics and microscopic observation were applied gradually , such as electrophoresis and zoning of isozyme and protein , karyotype and zoning , molecular markers etc . Research of ecotype and genotype from the individual level-the cellular level-the molecular level are a notable feature of this stage .

Ecotypic status and role 1 . Introduced value : Ecotype is an important theoretical concept . Success or failure of introduction depends not only on the different extent of ecological factors between regions , but also on ecotypic role . Because species are widely distributed , ecological range is wide , it is inevitable that intraspecies have ecological differentiation . If it isn't introduced to the most appropriate ecological types , the result of the introduction will be affected . 2 . Domestication and screening value : Screening , only those ecological types having the strongest adaptability and the most excellent production characteristics representative of a desirable forage , can domesticate the most excellent type for forage production . 3 . The value of breeding : Ecotype is an important source of cultivating improved varieties ; excellent ecotype not only can be directly used for the production , but also can serve as the parental materials of breeding , and to cultivate new varieties with characteristics better than its parent's . In the desirable plants of widespread species , long-term natural selection differentiate into ecotypes having immeasurable excellent source of genes . Today utilizing excellent ecotype to cultivate new varieties is a developmental trend .

The importance of carrying out the research and the application of fine forage's ecotype in China China is one of the countries having the greatest abundance of forage germplasm . China is vast in territory , complex natural environment , with abundant widespread desirable forage and ecotypes . In recent 30 years , we have initiated and finished some keystone , inspection of forage germplasm and collection of partial germplasm in a typical steppe . On the whole , we have found status quo and substantial resources of forage germplasm in those regions . But because of a late start , lack of material resources , financial power and manpower , collection of germplasm is neither general nor systemic . In our country , wild species , closely related species , and escaped species are rich in desirable cultivated forage systems , peculiar desirable forage is also abundant , coupled with plenty of new wild species having exploitation potential , which are all the important materials basis for collection and identification of forage's ecotype . A large amount of practical experience tells us that conducting ecotypic collection and research are not only feasible but also very necessary . These collections of desirable forage ecotypes , in the same conditions as field systemic identification and in-depth studies of physiology , biochemistry and genetic , should aid in screening and seeking out a group of desirable forage with high quality , high yield and multi-resistance . The practices will have a very important role in introduction of desirable forages to ecological zones and direct utilization and cultivation of new varieties .

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