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Aegilops cylindrica: CHALLENGES FOR GRAIN PRODUCTION AND FOOD SECURITY

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The rapid spread of *Aegilops cylindrica* in southern Ukraine threatens agricultural plant communities because this highly competitive, monocotyledonous, winter annual or biennial species competes with cereal crops. According to many authors, hybridization and introgression between cultivated wheat–especially varieties carrying herbicide-resistance genes, such as those in the Clearfield system–and *A. cylindrica* may pose a problem for agriculture. In southern Ukraine, cross-pollination between wheat and Aegilops occurs; however, until recently, no fertile or stable offspring resulting from such spontaneous hybridization had been observed. Wheat's genomic formula is AABBDD (2n = 6x = 42), while *A. cylindrica*'s is CCDD (2n = 4x = 28). Only one genome (D) is homologous. In the F1 hybrid ABCDD, only the D-genome chromosomes, which are highly homologous, conjugate during meiosis. The remaining 21 chromosomes (A, B, and C) are all univalent, so the probability of forming genetically balanced, viable gametes is low. Consequently, the F1 hybrid is sterile and unable to produce viable plants. The only potential issue is the appearance of atypical F1 hybrid plants in seed fields. These plants are also sterile and nonviable.

In contrast, the development of *A. cylindrica* resistance to herbicides, primarily ALS resistance, poses a serious agronomic problem caused by a combination of internal and external factors. Internal factors include the species' biological characteristics, such as its high hybridizing ability and adaptability to changing conditions. External factors include the irrational use of herbicides in crop rotations. Effectively

addressing this issue requires a comprehensive approach to managing agro-phytocenoses that integrates a wide range of studies on the components of these communities to minimize herbicide load and prevent the further spread of A. cylindrica populations resistant to herbicides.

Applying a mixture of mesosulfuron-methyl, iodosulfuron-methyl, thiencarbazone-methyl, and mefenpyr-diethyl leaves *Aegilops* plants in the lower canopy layer and significantly increases wheat competitiveness. This approach can be viewed as a strategy for developing environmentally safe weed control systems that keep weed populations below damage thresholds.

Thus, research on the genus *Aegilops* is important for understanding the evolutionary processes that led to the emergence of cultivated wheat and for addressing practical challenges in modern crop production.

Keywords: *Aegilops cylindrica*, competitive interactions, resistance.

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