

MAPPING OF HERBICIDE RESISTANT *ECHINOCHLOA* SPP. POPULATIONS IN NORTHERN ITALY (LOMBARDY)

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INTRODUCTION

ITALY IS THE FIRST EUROPEAN RICE PRODUCER NATION, WITH ABOUT 230,000 HA DEDICATED TO THIS CROPPING MAINLY LOCATED IN NORTHERN REGIONS. IN LOMBARDY, THE CULTIVATION OF RICE IS MOSTLY CARRIED OUT IN AQUATIC ENVIRONMENT AND THROUGH SINGLE-CROP CULTIVATION. THESE AGRICULTURAL PRACTICES AND THE REPEATED AND CONSTANT USE OF A NARROW RANGE OF HERBICIDES FAVOR THE EVOLUTION OF HERBICIDE-RESISTANT (HE-R) WEED POPULATIONS THAT REPRESENT ONE OF THE MOST CRITICAL ASPECTS IN WEED MANAGEMENT.

AMONG THE MOST DISTRIBUTED WEED SPECIES, THE GENUS *ECHINOCHLOA* (P.) BEAUV. (*POACEAE*) REPRESENTS ONE OF THE MOST PROBLEMATIC; IT INCLUDES ABOUT 50 SPECIES. SEVERAL STUDIES DEMONSTRATE THAT THESE BIOTYPES EXHIBIT DIFFERENTIAL HERBICIDE SUSCEPTIBILITY.

OBJECTIVES

ONE OF THE AIMS OF *EPIRESISTENZE* PROJECT IS TO MAP THE EVOLUTION OF *ECHINOCHLOA* SPP. HER IN THE LOMBARDY RICE TERRITORY, ANALYZING HER GENE EXPRESSION AND FOCUSING ON THE ECOLOGICAL (BIOTIC AND ABIOTIC) FACTORS RELATED WITH HER DEVELOPEMENT.

METHODOLOGY

RESISTANT *ECHINOCHLOA* POPULATIONS WERE SURVEYED DURING THE 2019 SUMMER SEASON AND GEOREFERENCED THROUGH Q-GIS3 SOFTWARE. A MAP OF THEIR DISTRIBUTION HAS BEEN PRODUCED BY OVERLAPPING THE DATA OF *ECHINOCHLOA* HER CASES REPORTED BY GIRE[®] (ITALIAN HERBICIDE RESISTANCE WORKING GROUP) WITH THE ONES DETECTED IN 2019 BY *EPIRESISTENZE* PROJECT TEAM.



resistant *Echinochloa crus galli* P. Beauv

RESULTS AND DISCUSSION

- THE RED AREAS REPRESENT THE MUNICIPALITIES WHERE GIRE[®] REPORTED CASES OF *ECHINOCHLOA* HER;
- THE RED SQUARES REPRESENT RESISTANT *ECHINOCHLOA* POPULATIONS WITHIN TERRITORIES WHERE GIRE[®] HAS REPORTED *ECHINOCHLOA* HER;
- THE GREEN SQUARES REPRESENT RESISTANT *ECHINOCHLOA* POPULATIONS WITHIN TERRITORIES WHERE GIRE[®] HAS NOT YET REPORTED *ECHINOCHLOA* HER;
- PRELIMINARY RESULTS SHOW THAT *ECHINOCHLOA* HER CASES ARE WIDELY SPREAD THROUGHOUT THE RICE-GROWING AREA OF LOMBARDY REGION: IN PARTICULAR, THE PROVINCES OF PAVIA, MILAN AND LODI ARE THE MOST AFFECTED.
- THE SURVEY OF *EPIRESISTENZE* PROJECT TEAM RECORDS *ECHINOCHLOA* HER CASES IN AREAS WHERE NO CASES HAVE BEEN DETECTED UNTIL NOW BY GIRE[®].
- *ECHINOCHLOA* SPP. DEVELOP RESISTANCE ESPECIALLY AGAINST ALS, ACCASE AND PHOTOSYNTHESIS INHIBITORS, ALSO SHOWING CASES OF "MULTIPLE RESISTANCE".

CONCLUSION

A HIGH RISK OF RESISTANCE EVOLUTION IS ASSOCIATED WITH TRADITIONAL RICE CROPPING SYSTEMS CHARACTERIZED BY INTENSE RATES OF MONOCULTURE AND IN AREAS WHERE WATER-SEEDING IS WIDE-SPREAD, SUCH AS IN THE PROVINCE OF PAVIA AND MILAN. FOR A BETTER MANAGEMENT OF *ECHINOCHLOA* HER CASES, IT IS IMPORTANT TO IMPLEMENT THE KNOWLEDGE OF THE CAUSES THAT ARE AT THE BASIS OF THE ONSET OF THE PHENOMENA OF HER.

