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Management of Spontaneous Plants

JOSÉ LUIS DA SILVA NUNES

Agronomist, Dr. in Plant Science, Administrative Director, BADESUL Development, Porto Alegre, Rio Grande do Sul state, Brazil.

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Introduction

The term spontaneous plant has been used in the literature to designate plants that occur in unwanted locations due to human activity. Since ancient times, when current cultivated plants were domesticated, the existence of “weeds” growing alongside established crops has been reported.[1]

Ecologically, spontaneous plants are defined as plants with little ability to compete in already established communities, but which colonize and dominate areas at an early stage of crop implementation.[2] They are considered plants that adapt more easily to the edaphoclimatic conditions of an area modified by man, largely due to their specific characteristics that facilitate their survival and dispersal.[3] They can also be defined as aggressive species that are normally part of the ecosystem where crops are installed.[4]

They are endowed with certain characteristics that are peculiar to them and that interfere with their management strategy. To manage these plants well, it is necessary to have a deeper understanding of these characteristics, which can be identified as:

1. Spontaneous plants can develop (germinate their seeds and grow) in unfavorable environments. This is a characteristic that varies depending on the species, as they all germinate and develop better in milder conditions, but certain species are capable of developing where others would not be able to.[1]

2. Spontaneous species are characterized by a high multiplication capacity, expressed by extreme ease of flowering. This is because, under whatever conditions, most spontaneous species flower and produce seeds.[1]

CONTACT José Luis da Silva Nunes joselsnunes@yahoo.com.br Agronomist, Dr. in Plant Science, Administrative Director, BADESUL Development, Porto Alegre, Rio Grande do Sul state, Brazil.

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3. Spontaneous plants have a high capacity for perpetuation and competition, expressed, together with dormancy, by the large quantity of seeds produced.[1]

4. The seeds of different spontaneous species have special adaptations that facilitate their dispersal, which can occur in different ways (by wind, animals, irrigation water, contamination of seed lots from cultivated plants, etc.).[1]

5. Spontaneous species present genetic variations within the same population that facilitate their adaptation to crop management practices, making them tolerant. The greater the heterogeneity of a population, the greater its capacity to adapt to management practices.[1]

These vegetables compete with the crop for water and nutrients and may also be responsible for the production and release of allelopathic substances into the environment, in addition to acting as intermediate hosts for insect pests and pathogens. In addition to direct losses, the presence of spontaneous plants reduces the efficiency of agricultural practices, increasing production costs. In practical terms, invasive species can be responsible, when not managed appropriately, for losses of around 30 to 40% of production.[5]

Conclusions

In order for a crop to remain productive and not suffer interference from spontaneous plants, a set of management practices must be used as correctly as possible. These involve a series of operations that, to be successful, depend on knowledge of the crop, the spontaneous weed species, its characteristics, the appropriate time to carry out management practices, the correct use of equipment and the capacity of the executing team.

The correct management of spontaneous plants is important, as these species can directly and/or indirectly interfere with crop production. Control of spontaneous plants can be done using cultural and chemical control methods.

The main Control Methods used are:

Preventive Control : aims to prevent the introduction or dissemination of spontaneous plants in production areas.[6]

Mechanical Control: carried out using weeding (manual or mechanical).[6]

Cultural Control: The main cultural control techniques are the use of smaller spacing between rows, greater planting density, appropriate planting time, use of varieties adapted to the regions, planting in a Direct Planting System (SPD), adequate fertilization, irrigation well managed and crop rotation.[6]

Chemical Control: When thinking about chemical control, some considerations must be made regarding the selectivity of the herbicide for the crop, the efficiency in controlling the main species in the cultivated area and the residual effect of the herbicides on the crops that will be planted in succession.[6]

Currently, chemical control, when executed properly, has great operational performance and presents the advantages of control efficiency, reduced competition since the crop's implementation, control of spontaneous plants in the rainy season, when mechanical control is impractical, not promoting damage to the roots of the crop, not disturbing the soil, allowing for better distribution of plants in the area, control of spontaneous plants in the crop line and, above all, rapid execution. Among the disadvantages are the requirement for adequate equipment and operator training. On the other hand, the cost of chemical control is much lower than that of mechanical methods, with the advantage of adding effectiveness in eliminating spontaneous

plants with vegetative reproduction. The application of herbicides can be carried out via land, air or irrigation and must be done uniformly and using appropriate equipment for each situation, as the highest percentage of problems related to inefficiency in the control of spontaneous plants is related to application problems. The great risk of using chemical control is the emergence of resistant spontaneous plant biotypes or the selection of populations tolerant to them.[7]

Finally, the control of spontaneous plants requires knowledge of the vegetative characteristics and the species' responses to factors that exert selection pressure, such as environmental conditions and the control methods used. This must be done using control methods (cultural and chemical) in an integrated manner, in order to maintain the infestation of spontaneous plants at adequate levels, without favoring the selection of tolerant species or the appearance of resistant species.

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