SEED GERMINATION STUDY FOR *SETARIA GLAUCA* L. SPECIES

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Abstract: The most important source of weeding in crops is the reserves of seeds weed in the soil. It has a huge reserve of seeds from weeds that have invaded the crops in previous years or growing on uncultivated places. Weeds cause damage, quantitative and qualitative to crops, by competing crops for water, nutrients and light. In addition, they can also be hosts for various pathogens or pests present in cultures, and some may be toxic. Weeds are natural limiting crop production factors, so the knowledge of morphology, biological and ecological features is important in terms of integrated management of weeds in crops. Setaria glauca L. (foxtail) is a heat-loving weed, annual Gramineae, with a strong multiplication through seeds. It prefers rich soils in nutrients, from sandy loam to sandy-clay lightweight. Her germination period is early spring and flowering period coincides the months from July to September.

Keywords: Gramineae weed, germination capacity, biological particularities

INTRODUCTION

Weeds grow in all circumstances, in all areas and in all crops. Farmers from today have a wide range of possibilities and methods to combat them. As technology developments, discoveries, these methods have multiplied, diversified and specialized. So far, in nowadays the concept of integrated weed control comprise several groups of methods of control: preventive or prophylactic methods group and the group of combat methods (agrotechnical, physical and biological methods), which acts after weeds appear. Biological particularities of weeds (multiplication, staggered germination, longevity, vitality and plasticity) and pedo-climatic conditions make as one method of control is not effective to remove all weeds in crops.

MATERIAL AND METHOD

The biological material consisted in *Setaria glauca* L. seeds harvested at different stages of maturation and the research method was based on rules established by experimental technique both in terms of location experiences, and the processing and interpretation of experimental results. The experiments were conducted between 2012-2013. To determine the germination capacity of mature and immature seeds of *Setaria glauca* L. seeds was collected during the milk phase but also seeds reached full maturity during on dissemination phase.

Harvest was made in two stages:

- In August, at the plants emerged in April-May
- In October, at the plants emerged later

Harvesting, for both phase were made on the same plant, seeds obtained was formed from seed obtained from 50 plant.

Harvested seeds were kept under laboratory conditions at a constant temperature of 22 degrees Celsius in dark. Determination of germination, depending on the time of

harvest and seed maturity stage at harvest was done in laboratory and field conditions as well. In both cases, the seeding was performed on 1 April in each year. In field conditions, were sowing 100 caryopses to 1,5 cm. depth, in three repetitions and in laboratory conditions have been mounted in germinating plates, each germinator containing 100 seeds in 3 repetitions ensuring the constancy of the temperature of 22 degrees Celsius.

The interpreted percentage values were obtained by averaging the three repetitions of each medium and the average of the measurements of the 2 years.

RESULTS AND DISCUSSION

The percentage changes on the germination rhythm of the 2 years were insignificant, differences that arose were between the average for each year germination under field conditions, depending on rainfall and temperature of each spring. Seeds harvested in the milk phase, succeed to mature after separation from the plant and to make a germination percentage between 26 and 32% in interval 1 April and 30 June depending on the harvest period. In the field, maximum germination was achieved in mature seed harvested in October, reaching 83% germination, whereas seeds tested under controlled conditions, the maximum was 64%.

Seeds harvested in August reach maximum germination (70%) under field conditions, in laboratory conditions the value obtained not exceeding 61%. Between the two experimental conditions there are differences in the maximum germination achieved by seeds of *Setaria glauca* L. The minimum initiation of germination is similar in both cases. Germination rhythm differ depending on the environment of experimentation and the harvest period.

Seeds harvested in October out of dormancy faster compared to those harvested in August. The mature seeds harvested in October, germination begins within 5 to 10 April. In the laboratory, there is provided a germination rate of 8, and the field conditions in the same time interval level achieved is 3%. Immature seeds germinated later in both conditions are met: the range of 15 to 20 April in the laboratory in an amount of 2% and 20 to 25 April under field conditions, achieving a germinal percentage of 4%. Comparing the germination period length from the sowing until the germination process is initiated, at the both categories of mature and immature seeds of *Setaria glauca* L., it can be concluded that the seeds disseminated in October have the opportunity to arise earlier in the spring than those disseminated August.

Going through vegetative stages in a faster rhythm at *Setaria glauca* L. plants emerged later (June-July) which disseminates in October lead to acceleration of generative processes. Germination rhythm is more intense at seeds harvested at maturity than those harvested at milk phase. In laboratory conditions (Figures 1 and 2), germination rhythm of same kind of seeds is majority in the first 15 days of exposure: 34% towards 64%.

In field conditions, seed harvested at the maturity phase in October, germinate mainly within 30 days after sowing (64%). In the the following periods, the percentage of germination dropped to 19 (Figures 3 and 4).

Germination rhythm is faster to seed harvested in October than in those harvested in August, in both phases of maturity. After 15 days from the sowing, mature seeds germinate in a proportion of 13% under field conditions and 34% under controlled conditions, while the seed harvested in August germination percentage within the first 15 days after sowing is 8% in the field and 28% in the laboratory.

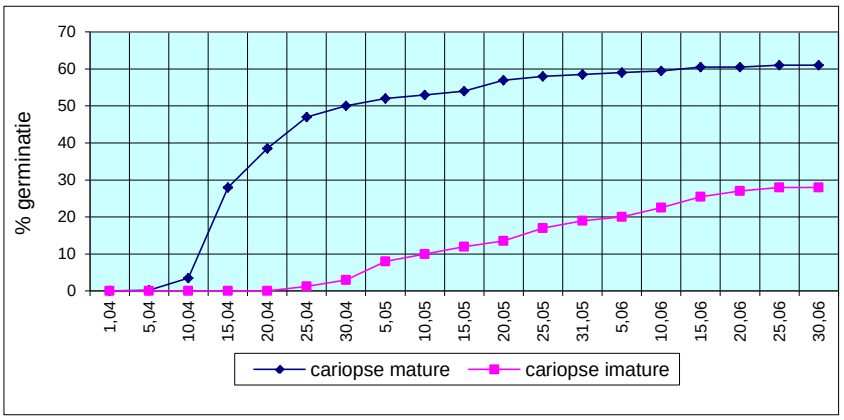

Fig. 1. Laboratory germination of Setaria glauca L. seeds harvested in August

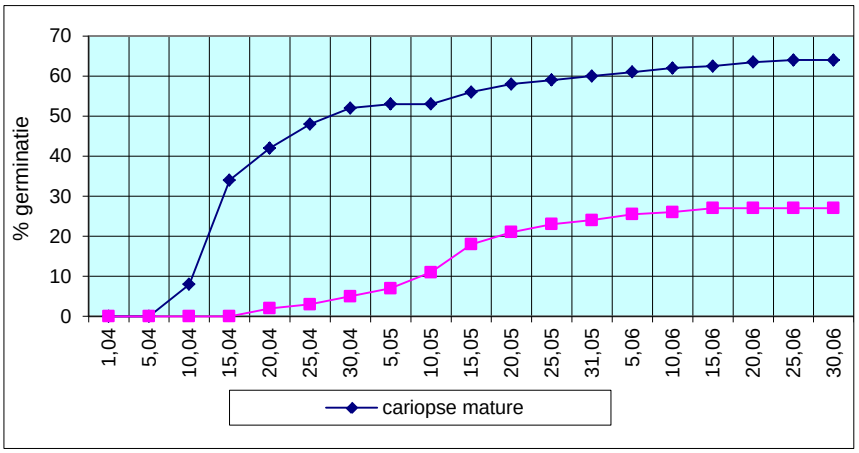

Fig. 2. Laboratory germination of Setaria glauca L.seeds harvested in October

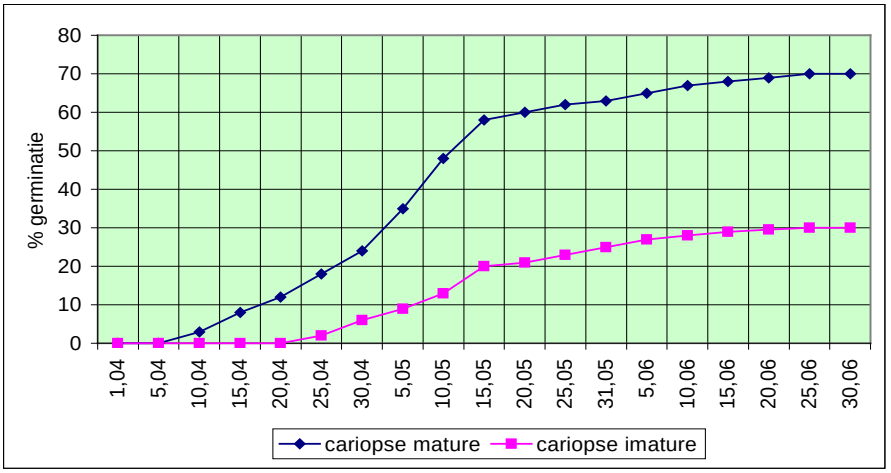

Fig. 3. In field germination of Setaria glauca L. seeds harvested in August

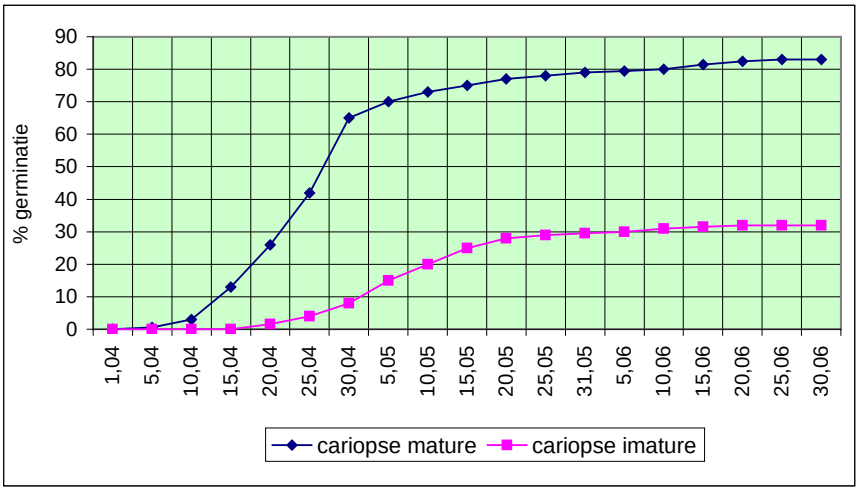

Fig. 4. In field germination of Setaria glauca L.seeds harvested in October

CONCLUSIONS

- Achieving higher germination values in the field conditions compare with laboratory is explained primarily through varying temperatures, respectively the alternation of day and night that stimulate the transition from dormant seeds in the active state;
- Seeds harvested during in milk phases succeed to mature after separation from the plant and to realize a germination percentage between 26 and 32% between time interval 1 April and 30 June, depending on the harvest period;
- Effective measures to reduce soil infestation with *Setaria glauca* L. seed in crops and reduce weeding in hoeing crops with that specie is to avoiding late weeding with *Setaria glauca* L. In respective cultures;
- Due to its biological particularities, are justified great competition on crops plants and mass emergence annually and almost all crop growing season. Soil seed reserves of this species reach very high values.

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