TESTING THE VITALITY OF SEEDS FOR THE ESTABLISHMENT OF HIGH-QUALITY SOY CROP

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ABSTRACT

To create high-quality soybean growth is very important to deal with the vitality of seeds before sowing it. One method of testing the vitality of seeds is accelerated aging test (AA test) associated with laboratory germination test. This test was performed in varieties delivered to the field trial in Studeněves and the results were compared with field emergence of varieties in this trial. The results indicated that the seed which had lower field germination, had also a lower laboratory germination test after accelerated aging. Merlin seed varieties we also before sowing dressed three different biologically active substances and once called a complex mixture of staining. The experimental results showed that the complex staining and all biologically active substances significantly increased seed vitality as used in the field experiment and vitality of seeds agend AA test.

Key words: soya, vitality seed, accelerated aging test, seed dressing

INTRODUCTION

Good stand establishment in soybeans is one of the most important factors to achieve high yield. Therefore, the quality, thus vital seed regarded as an essential prerequisite for the establishment of a highly productive plants. Differences in seed vigor can be determined by many factors. The main characteristics defining the quality of seeds is considered laboratory germination Procházka et al. 2011). A high percentage of germination of seeds produced is the best advertisement for a seed company. Specific requirements for germination, although a link with commonly achieved values of percent germination of seed crops, but in fact poses certain limits, which are related to the sharp decline in vitality, if and when, under the germination percentage (Hosnedl 2003). Laboratory germination is evaluated according to international rules ISTA (International Seed Testing Association), which guarantees international comparisons and provide business not only in Europe but also globally (Pazderů 2009). Although physiologically seeds have the ability to germinate usually already in the early stages of development, is a variety of crops to achieve a high seed germination big problem. Examples include legumes (including soybeans), which can be certified seed germination from 80% (Coolbear 1995 Hosnedl 2003). Although the most important features of seed quality seed has a high germination and good health for growers are decisive criteria field emergence and germination balanced. To increase prediction field emergence are used variously modified laboratory tests vitality into which are inserted a certain stress factors. Methodically usually compares the germination of fresh seed and seed deteriorated, ie aged, or worse (Coolbear 1995 Procházka et al. 1998 Hosnedl 2003). The simple methods for evaluating the vitality of seeds belong conductivity test, accelerated aging test, cold test and Hiltneruv test laboratory germination. Internationally it is recognized only the conductivity test vitality seeds of peas and soybeans accelerated aging test. Both of these methods has the potential to further use. Other methods have problems with repeatability, observing the same terms and objectivity of evaluation (Hosnedl 2003). Accelerated aging tests (AA test) was originally designed as a test shelf life of seeds. It is currently used as a test for soy vitality (Procházka et al. 2011). AA test exposing seeds for short periods of high temperature and humidity. During the test, the seeds receive moisture from the environment and the increased water content, together with the high temperature causes rapid aging of the seeds. Seeds with high durability more resistant to these stress conditions and age more slowly than seeds with low lifetime. Accelerated aging tests in soybeans is to some extent the durability test, which applies to both field emergence and to predict whether a given seed can be over stored to the next year (TeKrony 1995 Hosnedl 2003)

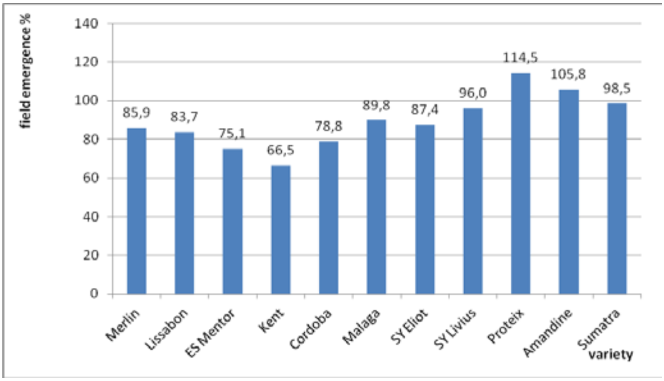
MATERIAL AND METHODS

The experiment was seed 10 soybean varieties for sowing in 2013, namely: Amandine, Cordoba, ES Mentor, Kent, Lissabon, Malaga, Merlin, Proteix, Sumatra, SY Eliot. Second seed was always a category C1, delivered directly to the distributor. Individual samples of seeds were subjected to the vitality of seeds for soya methodology ÚKZUZ, a method of accelerated aging tests (AA test). This methodology is based on the methodology for accelerated aging test according to ISTA. Out of the ten varieties AA test We conducted a follow-up test laboratory germination in seed varieties Merlin, which was stained in setting up the field experiment on location Studeněves. For staining were used following biologically active substances: Lignohumate B (a mixture of humic and fulvic acids), Lexin (a product consisting of a mixture of humic acid, fulvic acid and auxin) and brassinosteroids (in an attempt substance was used under the name 4154, ie diluted synthetic analog of the natural 24 epibrassinolidu 2α, 3α, 17β-trihydroxy-5α-androstan-6-one, which in turn are just as brassinosteroids). The last variant dressing mixture was named as "Comprehensive pickling" (mix), consisting of saturated sucrose solution, Lexin, fungicidal mordants Maxim XL 035 FS and adjuvants based pinolenu Agrovital. Results of AA test and subsequent laboratory germination tests were compared with field emergence of varieties and variations of pickling field trial, which was located in the Studeněves (50 ° 13'50" N, 14 ° 2'54" E), at an altitude of 306 m

RESULT AND DISCUSSION

Figure 1 shows that the seeds of the varieties showed relatively large differences in field emergence. However, these differences were not identified from the data supplied seed companies, but not from the results of laboratory germination of seeds, which was four months after delivery. One exception is the variety Kent, which was very low as field emergence and laboratory germination even after four months. In this case, it should be emphasized that the company supplying the seed varieties he added, with a cover sheet with the caveat that it is an attempt to seed, not the seed placed on the market. A more detailed examination of seed, or performing accelerated aging tests and subsequent laboratory germination tests, we found how the seeds of the varieties vital. The achieved results are presented in Figure 4, from which it is evident that some varieties is quite a significant difference in germination of seeds loaded AA test and seeds that did not pass this test. This difference should be the case for the vital seed as low as possible. We deliberately because vitality test performed after four months supply of seed (basically since seeding) to better demonstrate its senescence (aging). Similar conclusions also describes TeKrony (1995). The results are then compared with laboratory germination of seeds (Figure 3 and Table 2). The results of field emergence and values declared by the supplier of seed germination is evident that the very vital seed to the manufacturer reduces their germination. In this step, the producer apparently tried to compensate for the lower seed vigor and satisfy your customers. These findings reached such Štranc et al. 2012.

Figure 1: Field emergence of varieties (in rel.%)



Merlin, the variety with which distributor set the germination of 95% and we found germination after four months was 85.9%, we conducted before sowing staining biologically active substances closer specified in the methodology. The results of field emergence is evident that the best working variant pickling is "Comprehensive pickling" consisting of saturated sucrose solution, Lexin, fungicidal mordants Maxim XL 035 FS and adjuvants based pinolen Agrovital. Similar results were also published Procházka et al. 2013. Very good results, however, was also used separately biologically active substances (Fig. 2).

Figure 2: Field emergence of stained seed (in rel.%)

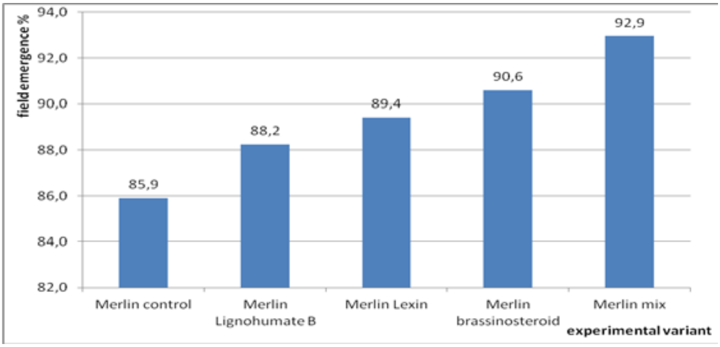
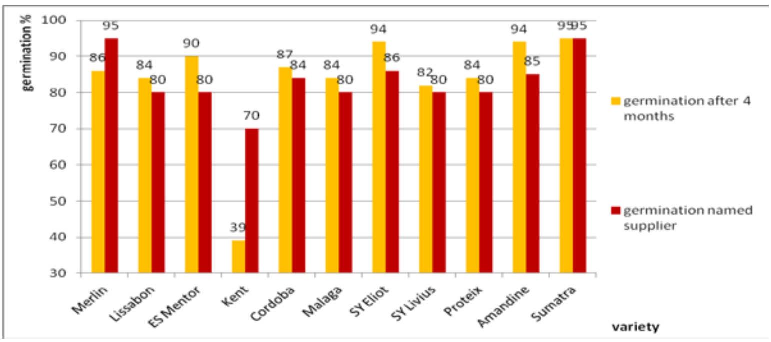


Table 1: Details of the seed

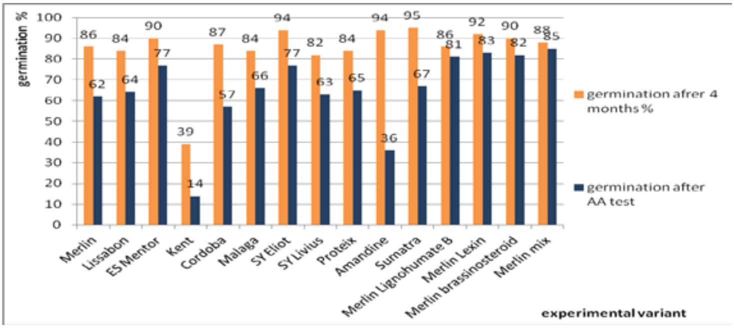
variety	germination mentioned distributor	germination observed after 4 months	seeding - Germinating seeds per m2
Merlin	95	86	68
Lissabon	80	84	65
ES Mentor	80	90	65
Kent	70	39	65
Cordoba	84	87	65
Malaga	80	84	65
SY Eliot	86	94	65
SY Livius	80	82	65
Proteix	80	84	65
Amandine	85	94	65
Sumatra	95	95	65

Figure 3: Declared germination of seeds and germination of seeds aged in%



From Figure 3, it is clear that, particularly in the lower germination of seeds in the sowing after four months deteriorated significantly as a result vitality of seeds represented TUS and laboratory germination. Conversely seed with good germination in most cases able to not only preserve their germination, but in most cases very good vitality represented in laboratory germination after TUS (Figure 4).

Figure 4: Laboratory germination of seeds after four months and AA test in %



CONCLUSIONS

Based on the results of accelerated aging tests, field emergence and that provided seed producers can be concluded that it is appropriate for agricultural practice and very beneficial, not only to deal with laboratory germination, but also the vitality of seeds already in the time before sowing. The combination of vitality tests (AA test) and laboratory testing of germination can successfully choose the optimal seeding seed and securing high-quality, well-integrated plantation. The results also show that all biologically active substances (especially brassinosteroides and Lexin) increased seed vigor, and can use them for agricultural practice fully recommended. These biologically active substances increased only field emergence, but especially vitality aged seed.

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