

Diversity of weed spectrum in grasses grown for seed in the Czech Republic



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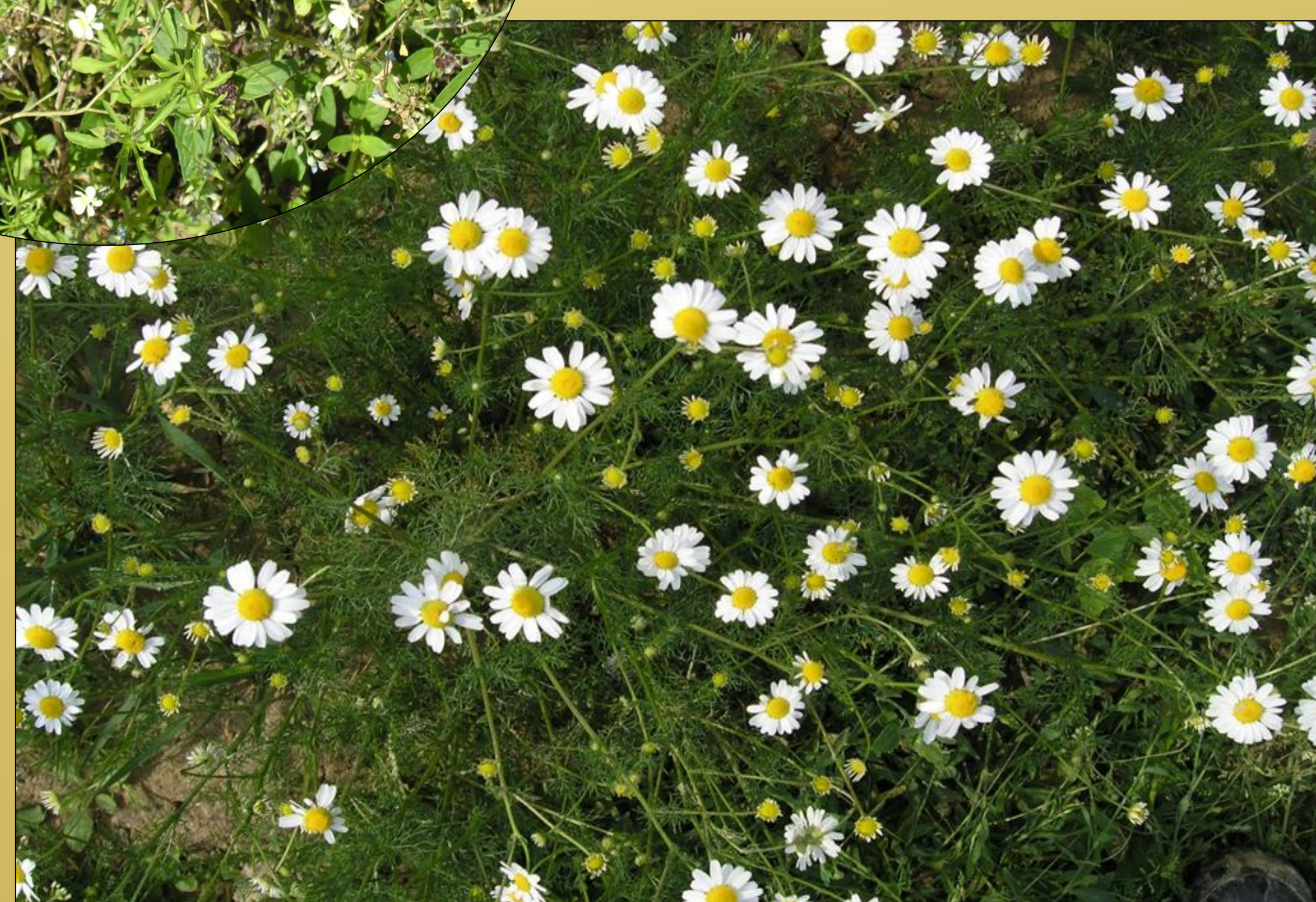
Introduction

The areas of grasses grown for seed which are an integral part of grassland fluctuated in the Czech Republic in the years 1999 – 2008 from 12 000 to 18 000 ha. One of the factors markedly affecting the level and quality of seed yield is an enormous occurrence of weeds in these stands. The objective of the study was to evaluate the diversity of the weed spectrum in grass seed stands and to show the trend in its development.



Material and methods

Throughout the monitoring period (1999-2008), about 500 samples were taken each year to estimate the incidence of weeds. The investigation of weed occurrence in seed stands was conducted on 2000 – 4500 hectares in 19 cultivated grass species located in different regions of the Czech Republic. The data of two typical weeds (*Elytrigia repens*, *Matricaria* and *Tripleurospermum* complex) and two invasive weeds (*Echinochloa crus-galli*, *Viola tricolor*) were processed by regression analysis in the Statgraphics program version XV.

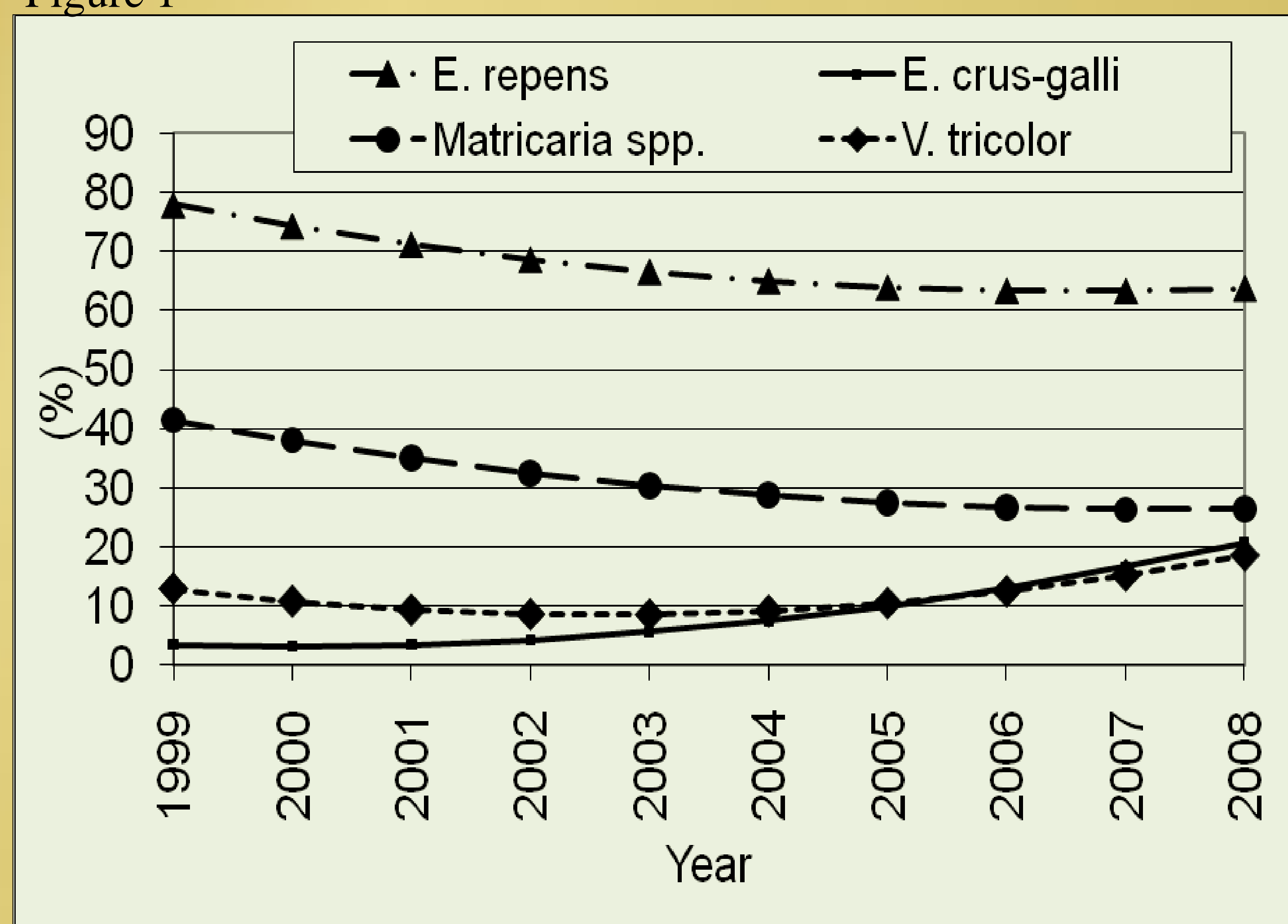


Results and conclusions

The grass weeds that occurred on more than 15% of localities throughout the ten years of observations were *Elytrigia repens*, cultural but undesirable grasses, *Apera spica-venti*, uncultivated *Poa* species and volunteer cereals. Other important monocotyledonous weeds persistently occurring on more than 8% of the areas under observation were *Avena fatua* and *Echinochloa crus-galli*. The most frequently occurring dicotyledonous weeds were species of the genera *Rumex*, *Matricaria* spp., *Tripleurospermum* spp., *Cirsium arvense*, *Viola tricolor* and species of the genus *Galium*.

The statistical analysis of occurrence of some important weeds brought some interesting facts. The incidence of *Elytrigia repens* decreased in the monitored period, but according to the calculated equation (Figure 1), its incidence has remained lately at a high level ($y = 0.2538x^2 - 4.3717x + 82.063$, $R^2 = 0.666$, y = weed incidence (%), x (1-10) = the years 1999-2008). This is not a desirable result as *Elytrigia repens* is one of the main factors reducing yield and quality of grass seeds and it is a reservoir of ergot (*Claviceps purpurea*). An interesting finding is the expanding occurrence of warm-loving *Echinochloa crus-galli* in the early stage of grass stands in recent years. It may suggest an increase in air temperatures over the growing season.

Figure 1



The incidence of *Echinochloa crus-galli* has an increasing tendency and further spreading should be expected ($y = 0.2754x^2 - 1.1019x + 4.2783$, $R^2 = 0.665$, Figure 1). Similarly, the recently increasing occurrence of *Viola tricolor* was investigated ($y = 0.3485x^2 - 3.2024x + 15.807$, $R^2 = 0.605$, Figure 1). On the other hand, a decrease of incidence of *Matricaria* and *Tripleurospermum* species, which belong to the most contemporary common and invasive weeds was observed: $y = 0.2159x^2 - 4.0538x + 45.323$, $R^2 = 0.639$ (Figure 1).



Differences in the occurrence of weeds in particular years may be caused by many factors: predominantly by a different spectrum of cultivated grass species, soil and climatic conditions and by different management practices (fertilising, crop protection).

Long-term monitoring of the weed spectrum in grasses grown for seed should give an overview of weed diversity in special perennial crops and also warn against spreading of new and non-traditional invasive species, the existence of resistant populations in some weeds and indicate the problems which aggressive weed species may cause in organic seed production and grasslands in general.