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On-farm examination of main-crop potato varieties in Hungary

Orsolya Papp*

Hungarian Research Institute for Organic Agriculture (ÖMKI), Budapest, Hungary

Characterisation of potato varieties in Hungary is based on conventional breeding and examination processes. Therefore organic growers need experimental data about the performance of new multi-resistant potato varieties under organic conditions. In order to provide sufficient information in 2012 we initiated a participatory-research program for testing resistant potato varieties under local organic conditions. 2012-2014 ten main-crop varieties were tested by participating organic farmers. Among the varieties *Bettina*, *Desirée*, *Démon*, *Hópehely*, *Katica* and *Tiamo* reached the highest yields. In the qualitative assessment the *Streptomyces* infection appeared to be most frequent. Among red-peel varieties *Démon*, among yellow-peel varieties *Hópehely* showed highest resistance to examined infections. The on-farm program is still running, in 2014 participant farmers' number grew to 22. Achievements and results underline the importance of on-farm participatory research networks.

Keywords: potato, resistant varieties, on-farm examination, participatory research, *Streptomyces*

1 Introduction

Conditions in organic farming demand more disease tolerant or resistant varieties. New multi-resistant potato varieties available in commercial sale in Hungary are results of conventional breeding processes, so organic growers do not have data about their performance under organic cultivation. Unlike in other European countries, organic potato trials are not widespread in Hungary, until 2012 only one trial has been done (Kovács et al., 2006) Therefore in 2012 ÖMKI initiated a participatory-research program in order to test available resistant potato varieties that might have a good potential in local organic farming. Moreover, aim of the program is to improve production technology of participating farmers, and facilitate the cooperation and communication among them, the agricultural advisors and potato breeders (Papp, 2014).

2 Material and Methods

In the spring of 2012 twelve certified organic farms joined the potato on-farm experimentation network. The trials were continued in 2013 and 2014 with 13-13 organic farms. Six Hungarian bred, multi-resistant varieties were examined during the vegetation period of 2012: *Balaton Rózsa*, *Démon*, *Hópehely*, *Katica*, *Vénusz Gold*, *White Lady*, along with a control variety: *Desirée*. Based on the results of 2012, the varieties that produced the best qualitative and quantitative results in main-crop trial – *Démon* and *Hópehely* – were tested further in 2013 and 2014. New promising international varieties were also included in the trials (*Bettina*, *Big Rossa*, *Dalida*, *Tiamo*).

Participating farmers planted their tubers every year mostly in April, the minimum size of the test plots was 12 m² for each variety. Cultivation methods were not aligned among farms – they used their usual practice. Quantitative and qualitative assessments were performed after harvest (August – October). Samples of 50 tubers were taken from each test plot of each variety. We conducted a visual inspection of the tubers' surface and recorded infection by *Streptomyces*, *Rhizoctonia*, *Fusarium*, *Erwinia*; severe damage by animals, *Agriotes* larvae, machines; we also recorded deformed or greened tubers.

* **Correspondence:** Orsolya Papp, Hungarian Research Institute for Organic Agriculture (ÖMKI), H-1033 Budapest, Miklos square 1, Hungary. E-mail: orsolya.papp@biokutatas.hu

3 Results

Average yields of varieties (kg/m²) for 2012-2014 are shown in Table 1. In 2012 *Desirée* and *Katica*; in 2013 *Tiamo* and *Hópehely*, and in 2014 *Hópehely*, *Démon* and *Bettina* had the highest yields. The reason of low yields in 2013 was the extreme dry weather, and the lack of irrigation possibilities by farmers.

Table 1 Average yield in the three years of examination

Variety	Average in 2012 (kg per m ²)	Average in 2013 (kg per m ²)	Average in 2014 (kg per m ²)
Démon	2.89	1.94	3.22
Desirée	3.01	n. e.	n. e.
Hópehely	2.82	2.09	3.82
Katica	3.08	n. e.	n. e.
Vénusz Gold	2.16	n. e.	n. e.
White Lady	2.45	n. e.	n. e.
Dalida	n. e.	1.71	n. e.
Tiamo	n. e.	2.37	2.97
Bettina	n. e.	n. e.	3.23
Big Rossa	n. e.	n. e.	3.13

(n. e.: not examined)

Results of the quality assessments show the most relevant production problems in Hungarian organic potato cultivation and their scale of importance (Fig. 1.).

The *Streptomyces* infection appeared to be the most frequent problem in Hungarian organic potato growing. The reason of regular infection is most probably the high organic matter compound of applied manure, which appears to be a suitable substrate for *Streptomyces*.

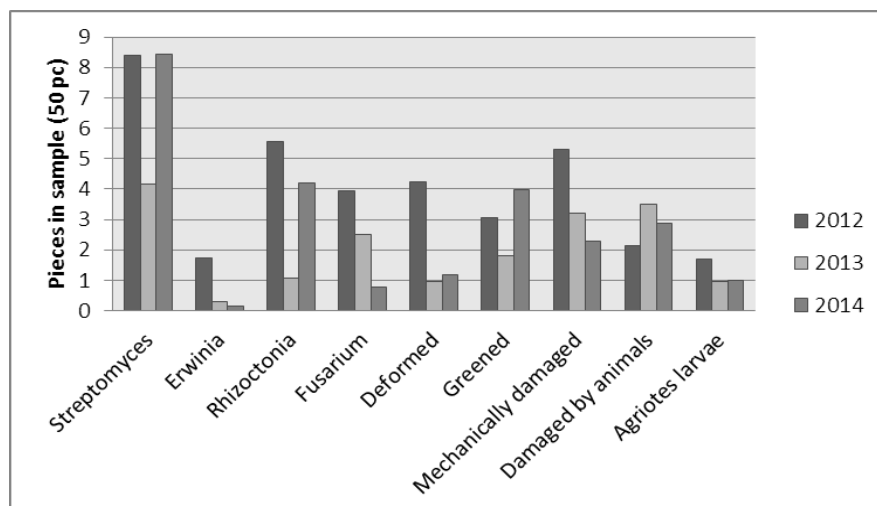


Figure 1 Summary of quality assessment results 2012-2014 (the average includes all of the tested varieties)

Among the red-peel varieties *Katica* and *Dalida*, among yellow-peel varieties *Hópehely* and *White Lady* showed the highest resistance to *Streptomyces* infection. Results were not always in line with official variety characterization (Fig. 2.). All together *Démon* and *Hópehely* showed the highest resistance to examined infections. *Dalida* also proved to be robust.

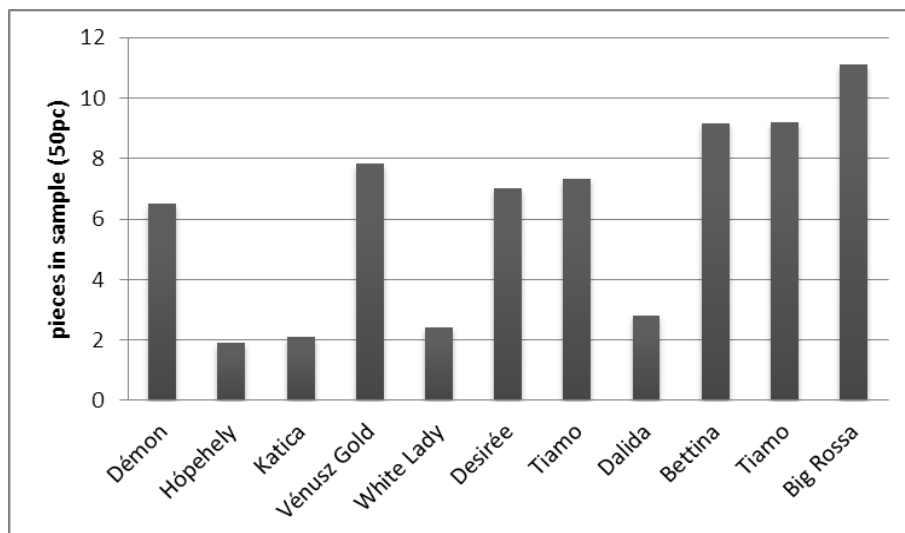


Figure 2 Number of *Streptomyces* infected tubers in sample of 50 pc (average of 3 years of examination)

4 Conclusions

All together ten main-crop potato varieties were tested in 13 organic farms during the presented three years of the on-farm experimentation network. Results of quantitative and qualitative assessments show that among the main-crop varieties: red-peel *Démon* and *Tiamo*, and yellow-peel *Hópehely* proved to be most suitable for organic conditions of participating farmers, and among the measured quality problems the *Streptomyces* infection was the most frequent one.

For the comprehensive examination of potato varieties' performance under organic cultivation methods in Hungary an organic potato workgroup was formed. In 2014 participant farmers' number grew to 22. Through meetings, technical leaflets and ongoing trials the know-how of participants is continuously developing, and the collaboration among stakeholders of the sector grows.

References

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