

MOTIVATIONS OF SMALL-SCALE PRODUCERS AND GARDENERS TOWARDS TOMATO LANDRACE UTILIZATION

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ABSTRACT

Old varieties and landraces of cultivated crops has gradually been excluded from commercial production as new varieties and hybrids overperformed them in yield quantity and in resistance to pests and diseases. However, these old genetic materials can act as a genetic pool for advantageous traits, therefore their maintenance is reasonable from a breeding point of view. The landraces are the elements of the extensive production systems as these do not require the use of synthetic fertilizers and pesticides. Their production can contribute to agrobiodiversity in species- and variety level as well.

Ex-situ conservation of these genetic materials is done by centralized gene banks. In-situ maintenance, however is less organized, as it is based on the choice of farmers. In our study, we investigated the motivations of Hungarian small-scale farmers and amateur gardeners to adopt tomato landraces in their production. The evaluation of the questionnaire revealed the strong interconnection of producers to their chosen genetic materials. This emotional-based link seems to be a good foundation to the small-scale maintenance, utilization, and survival of this agricultural heritage.

Keywords: plant genetic resources, sustainability, agricultural diversity, agricultural heritage

INTRODUCTION

The significant and permanent reduction of genetic diversity is a global issue. The number of landraces and ecotypes that are lost can reach up to fifty thousand in a year. The subsistence of these ancient cultivated crop types is threatened by the changes in agriculture. Initiatives has been started in order to save the indigenous varieties and types of the Carpathian basin including collection and maintenance. (ÁNGYÁN and MENYHÉRT, 2004).

The aim of in situ gene conservation is to produce the landraces and ecotypes in their original region where those have been selected. A further step towards is the on-farm conservation, when the propagation material of the selected landraces is provided for local producers and gardeners who are motivated to contribute to the maintenance of a certain genetic material. The purpose for such initiatives is to enable farmers to get to know these old ecotypes and to encourage them to attach to these genetic materials, which can be a key factor for the long-term maintenance of these plants. This link can be purely economic, such as good marketability or popularity, or can be emotional, if for example, a farmer is interested in producing the variety, which was inherited from their grandparents and re-introduced by institutions supporting on-farm programs. (ÁNGYÁN and MENYHÉRT, 2004). Landraces are the part of our national cultural heritage; their maintenance is a national obligation. The collection, maintenance, and production of native crop types all contribute to the agrobiological diversity. A historical landrace belongs to the region where it has been selected; it supports ethnobotanical research and sustainable landscape management (HARSÁNYI et al., 2013).

The main advantages of landraces are the possibility of free seed saving, the contribution to the agricultural diversity, the generally better organoleptic profile and valuable nutritional content, and the high vigor and adaptability. Besides these objective aspects, the emotional link can be determinative for several farmers, therefore landraces can be considered as the special crossing of food and memories. These agricultural memories can connect generations and different social groups of the present (JORDAN, 2015). Taste can relate to childhood memories, and the maintenance of landraces can conserve these feelings. Some landrace producers therefore consider themselves as caretakers (JORDAN, 2007), some feel, that these plants have become the part of their identity (JABS, 1984). This “edible memory” (Jordan, 2015) inspires farmers to save seeds, to pass it on, and to sow it in their gardens every year

(Jordan, 2007). Some people are motivated by their memories (PEARSAL et al., 2016, FALXA SONTI and SVENDSEN, 2018), while others are experimenting or trying to link to the past (JORDAN, 2015). A general human urge is to explore something in the present, which is sufficiently valuable to inherit to their progeny (JABS, 1984). Most of the landrace producers are not professionals. They are amateurs, who became collectors by testing more and more genetic resources over the years. These collectors are very committed to preserving the seed of as many landraces as possible, regardless of the actual demands of the society. They give the core of the landrace movement, and they will be the persons, who are capable to explore new advantageous traits, such as resistance against a new pathogen, or novel fruit shape. Their example can be inspiring for others to produce and maintain landraces (JABS, 1984).

As emotional aspects can be a key for the subsistence of landraces, our study focused on surveying the motivations underlying and the strength of these links.

MATERIALS AND METHODS

The emotional relation of small-scale farmers and amateur gardeners were evaluated by a questionnaire based on Google Forms and shared on relevant Facebook groups on September 2021 and were available for ten days. Questionnaires were shared exclusively in relevant Facebook groups and all members were targeted, who had any experience with the production of any accession of any landrace species, including vegetables and fruits as well. The questions covered the theoretical and practical knowledge regarding landraces, the cultivation practices including chemical use, and the emotional ties towards the landraces the farmers use. The responses of 258 respondents were evaluated using MS Excel visualization tools. The questionnaire consisted of 8 single choice, 3 multiple choice and 25 qualitative questions. The latter type used a 1 to 5 scale for responding. Besides pre-defined answers, which were employed for easier evaluation, there was also space for adding comments.

RESULTS

The typical respondents were women aged between 41 and 50 years (Figure 1), living on a city or village (Figure 2a), and cultivating rather higher field surfaces (Figure 2b).

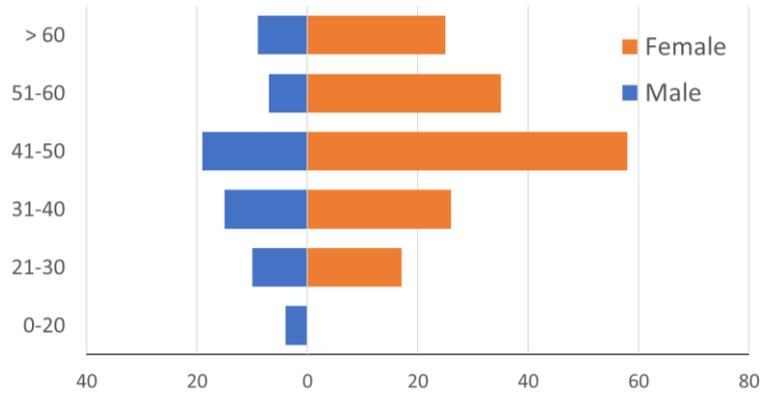


Figure 1. Age and gender distribution of respondents, who produce landraces in their fields.

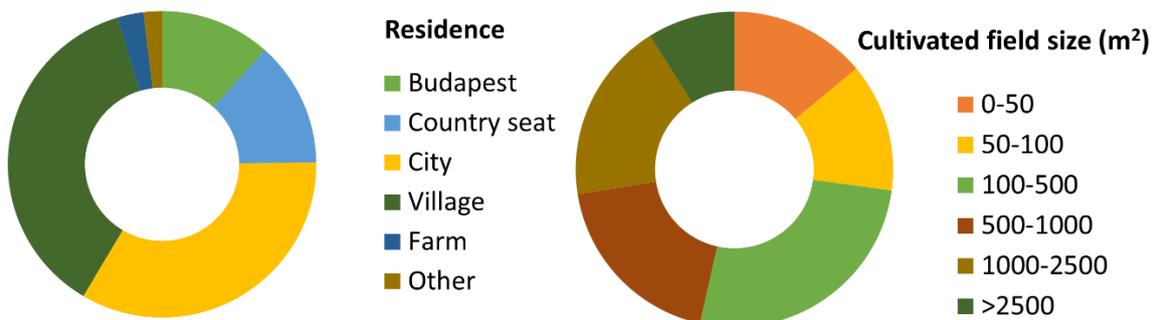


Figure 2a and b. Residential distribution and cultivated field size of landrace producers

Tomato and paprika are the most frequently cultivated crops (Figure 3), followed by fruits and other vegetables. Root crops and bulbs are considerably the least popular groups, when landrace species distribution is evaluated.

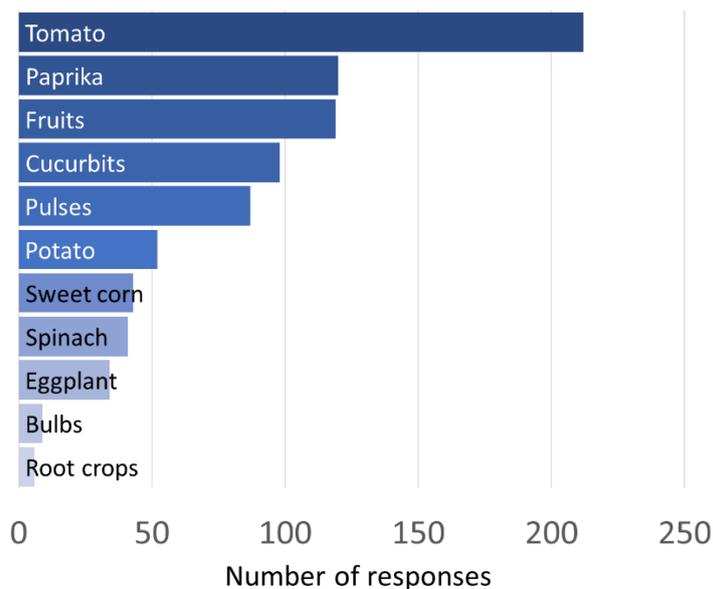


Figure 3. Most frequently cultivated landrace crops among farmers and gardeners as respondents of the questionnaire.

The majority of respondents have a strong emotional tie towards the cultivated landraces (Figure 4a-d); the results of all four presented questions shows, that about 60% (strongly agree or agree) of the landrace producers have a strong emotional influence on variety/landrace selection and on seeding plan preparation. The same ratio of respondents feel, that landraces have a link to their history.

The questionnaire also revealed, that the emotional relationship towards landraces is not originated from childhood memories in every case, as less than 50% of respondents agreed strongly or agreed with the related statement.

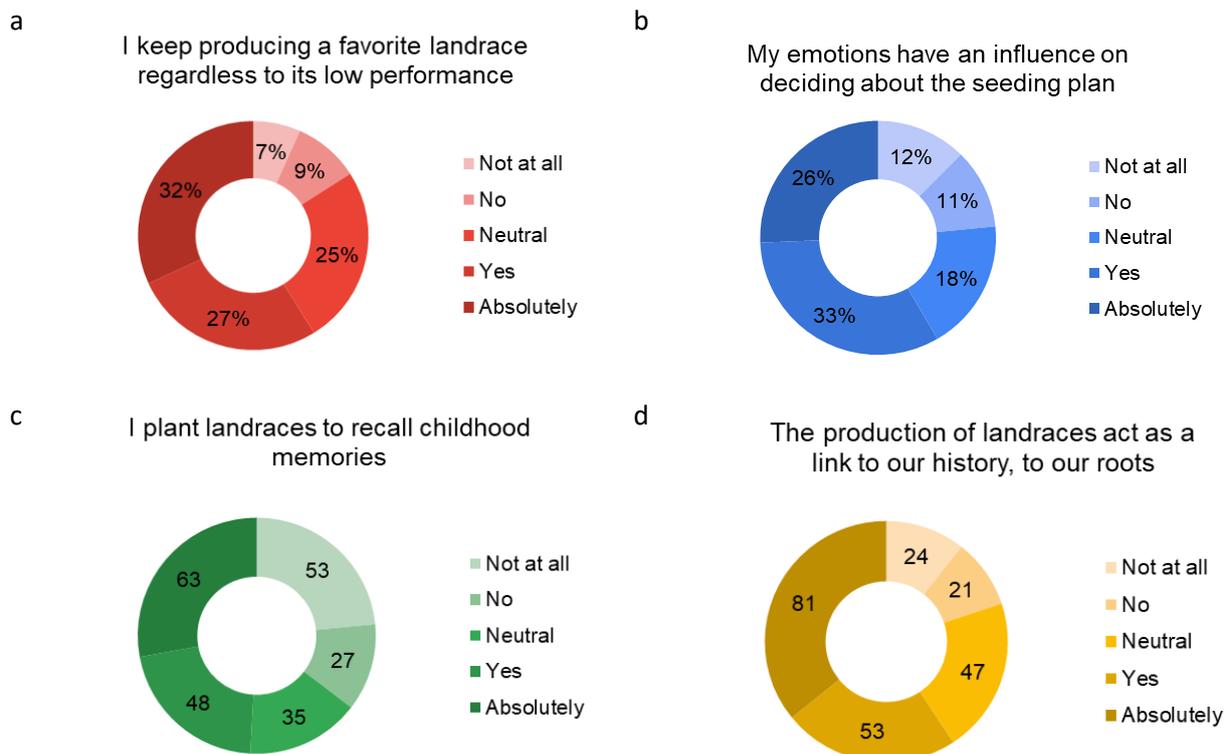


Figure 4a-d. Responses of producers to questions focusing on their emotional relationship towards landraces.

DISCUSSION

According to the gender distribution, women are more willing to experiment with landraces that yield less, but other visual, nutritional or culinary characteristics might be appealing. This might be explained by the generally higher influence of emotional motivations for women; additionally, they are more open to fill out questionnaires, than men. The general field size data showed, that landraces are present not only in small amateur gardens, but in more professional agricultural segments as well, which can be a good sign of re-introduction of landraces to agricultural production and marketing, at least in a local scale. The re-utilization of landraces is essential for the *in-situ* maintenance of landraces.

Tomato shows a high diversity in phenotypic characteristics, and its wide culinary use also contributes to its paramount popularity among landrace producers. This is in agreement with other sources reporting the high popularity and diversity of tomato landraces among

farmers worldwide. Paprika is the other cash crop that is relatively easy to produce in small scale and provides a wide visual assortment in intra-species level. The relatively low popularity of certain crop groups can be influenced by the actual availability of the propagation materials provided by gene banks.

The majority of respondents have a strong emotional tie towards the cultivated landraces regardless to the actual agricultural performance of a given genetic material; although this enthusiasm is strongly attached to a person, it can support the medium-term on-farm maintenance of a landrace. The questionnaire also revealed, that the emotional relationship towards landraces are not originated from childhood memories in every case; this might indicate, that the connection between farmers and landraces is partly based on stronger practical experiences, which also strengthens the survival and conservation of landraces for the future generations.

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