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IMPROVING THE QUALITY OF ORGANIC NATIONAL SEED DATABASES TO INCREASE THE USE OF ORGANIC SEED AND PROPAGATION MATERIALS IN EUROPE

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Abstract: The purpose of the national organic seed database is to list the seed varieties for which organically produced seeds and vegetative propagation materials are available in the market. The correct functioning of the organic seed database can facilitate the use and distribution of organic seed by improving transparency of the organic seed market. Each EU member state is free to establish its own database, resulting in varying different specific technical solutions among countries. In this study, quality of existing organic seed databases in place in all 28 EU member states and Switzerland was evaluated using different usability criteria. Our analysis revealed that fully computerised databases are to be preferred as they can influence the user's perceived completeness. Moreover, suitable support and training should be provided by the database managers to improve users' comprehension of database and to increase ease of use.

Introduction: The use of organic seed and vegetative propagation material is one of the most important principles in organic farming. According to the current EU organic regulations (EC, 2007; EC, 2008), the use of organic seed is mandatory for all organic farmers operating in the member states. Authorisations for the use of non-organic seed is considered as an exceptional production rule and can be granted only to farmers who can demonstrate that no organic seed is available in the national organic seed database. The implementation and maintenance of a computerised database is, therefore, mandatory for each EU member states in order to consistently update the list of the varieties for which organically produced seeds and vegetative propagation material are available in the market. This will gain even more importance with the coming into force of the new European organic regulation (EU 2018/848), according to which the derogations should be phased out and only organic seed should be used by January 2036. The aim of this paper is to provide an analysis of the effectiveness of the organic seed database currently in place in the EU. Based on the results, suggestions for improvements are provided.

Material and methods: An online survey was administered in November 2018 to a sample of 546 database users: 464 organic farmers, 41 seed suppliers, and 41 certification bodies operating in the 28 EU member states and Switzerland.

Three constructs were used in the questionnaire to assess the quality of the databases (see Table 1): *perceived ease of use* (3 items), *perceived comprehension* (3 items), and *perceived completeness* (4 items). The database evaluation questionnaire was developed by consulting available literature on usability and user satisfaction of online databases. The studies by Elling *et* al., (2012) and Sheikh, (2017) were used as the main sources to define the constructs and the relative items. All the scale items were measured using a 5-point Likert scale (from 1 = "strongly disagree" to 5 = "strongly agree"). Measurement reliability and validity were evaluated. Cronbach's alpha provided strong evidence of measurement reliability for all constructs, except *perceived comprehension*, whose alpha (0.68) is just above the minimum acceptable threshold of 0.63 (see Table 1). A general evaluation of national organic seed databases in use in the EU member states and Switzerland was performed to identify potential features that could have an impact on the perceived database quality. The evaluation resulted in the identification of the following three main characteristics: (i) interactivity (i.e. databases that offer the possibility to navigate to search for available organic seeds, in contrast with databases that only provide a static list of crops); (ii) availability of guidelines (i.e. databases providing information to support users as they navigate through the system); (iii) real-time update (i.e. databases that allow direct data entry and updates by seed suppliers, in contrast with databases that need to be updated by database managers). Non-parametric tests were performed on latent construct scores, using either a Wilcoxon signed-ranks sum when considering database binary characteristics, or the Kruskal Wallis when considering multiple groups of end-users (farmers, seed suppliers, and control bodies). All analyses were performed using STATA (version 15).

Results: Results revealed that most of the surveyed users found the databases comprehensible and easy to use. Database completeness was the most critical aspect: the average value of the *perceived completeness* scale was relatively low (mean = 3.08, SD = 0.83), indicating that many users had a negative feeling associated with this quality dimension (see Table 1). Wilcoxon signed-ranks test indicated that *perceived completeness* was higher for the interactive databases than for the static databases ($Z = 2.02$, $p = .004$), whereas *perceived ease of use* was statistically significantly lower for the interactive databases ($Z = 2.32$, $p = .020$). The databases with real-time update exhibited a higher *perceived completeness* than that of the databases updated by database managers ($Z = 2.66$, $p = .008$). Results indicated that we cannot reject the equality of the average perceived comprehension score when comparing the interactive *v.s.* static databases ($Z = 1.30$, $p = .193$); and the real-time update *v.s* database manager update ($Z = 0.30$, $p =.761$). *Perceived completeness* was higher for the databases that provided guidelines than for those without guidelines ($Z = 2.48$, $p = .013$). However, contrary to expectations, databases with guidelines were less easy to use and less comprehensive than those without guidelines: *perceived ease of use* ($Z = 2.56$, $p = 0.010$;); *comprehension* ($Z = 2.30$, $p = 0.021$). Finally, significant differences in comprehension were seen among the three groups of users, with a mean rank score higher for control bodies compared to farmer and seed suppliers ($\chi 2 = 14.98$, $p=0.001$). Results of our analysis were confirmed by running a SEM on multiple constructs and testing for latent mean difference.

Table 1. Measurement properties for the multi-items constructs

Construct	Mean	S.D.	Cronbach's Alpha
Perceived ease of use			0.80
I find the database easy to use	3.48	0.95	
I have difficulties using the database	3.30	0.94	
I consider this database user-friendly	3.54	0.99	
Perceived comprehension			0.68
The language used in this database is clear to me	3.68	0.88	
I find the information in this database easy to understand	3.59	0.87	
I find many words in the database difficult to understand	3.57	0.93	
Perceived completeness			0.83
The database provides me with sufficient information	3.23	0.94	
I find the information in the database incomplete	3.12	1.06	
I find the information in the database accurate	2.79	1.00	
This website provides up-to-date information	3.17	1.04	

Discussion: Although the establishment of a computerised database is mandatory for all EU member states, the EU organic legal framework stipulates only minimal requirements for the development and implementation of the national organic seed databases. However, our analysis revealed that characteristics of the databases are significantly related to the perceived usability of the end users perceived usability. Fully computerised databases, such as interactive databases and real time updates databases, are to be preferred by the EU member states because they can be more easily and frequently updated and offer many additional functions and features that can influence their completeness. However, results of our analysis indicate that fully computerised databases are in some cases perceived as less easy to use. Nevertheless, with increasing numbers of seed offers and information provided, these databases could become more complex in comparison to databases with fewer entries of seed offers. Further analysis should be conducted to consider potential relations between perceived ease of use and number of seed offers included in the databases. Moreover, to fully exploit the potential of computerised databases, it would be necessary to provide the end users and especially farmers, with appropriate support and training to reduce the effort of navigating the database website. The establishment of a complete and easy-to-use database is one of the most important actions that a competent authority should implement in order to limit the number of derogations, as it can strengthen market transparency and ease the matching of organic seed supply and demand.

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