PEAR BREEDING FOR THE FUTURE

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Abstract

This study was carried out to determine the future expectations of primary and secondary school students on fresh pear fruit, to raise awareness on the social and environmental effects of resistance breeding studies, and to provide information about the process of obtaining new pear varieties. 360 students from elementary and secondary schools took part in the activities planned as part of the pear fruit breeding studies. Students created works in the story, picture, slogan, and logo design categories during the activities. 383 works participated in the competitions. It was attempted to determine the "new pear variety perception" in the students' minds using the content analysis method. Not only students, but also teachers and parents were reached through awareness trainings in primary and secondary schools. The results show that students in the 10-14 age group like green and yellow pears, as well as red, sweet, crunchy, soft, or crispy pears. The findings are expected to be significant for future forecasts on the characteristics of new pear cultivars, which could take up to 25-30 years to evolve.

Keywords: *New varieties, elementary school, consumer perception, hybridization*

Introduction

Fruits are important nutritional components because of their high biochemical content, which is required for health. Awareness of these foods, which play an important part in human nutrition, is especially important for young people, who eat a lot of unhealthy foods. In this context, social studies to enhance fruit consumption among young people are extremely important (Klepp et al., 2005; Hakim and Meissen 2023; Ingman et al., 2022). However, access to fruits is getting more and more challenging every day. Fruit production is endangered by changing climatic conditions and increased pressures caused by abiotic and biotic stress. Aside from the obstacles in production, the fact that the fruits produced must meet the tastes and expectations of consumers adds to the sector's stress. This necessitates the development of new fruit varieties that will satisfy consumers for a better future. At this point, the attitudes and behaviours of early age groups will determine the acceptance of new varieties and the sustainability of fruit production and consumption. Studies conducted under topics such as identification of fruit, taste tests, nutrition, creative snacks, computer games, social messages, fun fruit activities, continuous reinforcement, parent involvement (Sharps and Robinson, 2016; Klepp et al., 2005; Zeinstra et al., 2021), besides raising awareness for healthy nutrition, are also very important in determining the future expectations, tastes, and preferences of new cultivars. In this study, activities and outputs organized specifically for the pear fruit for primary school students are included to raise awareness about healthy nutrition and new fruit varieties in society.

Material and Methods

This study, carried out by the Fruit Research Institute (MAREM), was designed within the framework of the MAREM pear breeding program. 360 4th and 7th grade students in Eğirdir district of Isparta province, where fruit growing is intense, participated in the study (Table 1). 51% of 4th grade students are female and 49% are male. On the other hand, 54.9% of the 7th grade students are female and 45.1% are male.

Table 1. Number of students participating in the study and gender distribution.

	4th Grade	7th Grade	Total
Student number	207	153	360
Female	106	84	190
Male	101	69	170

The study was conducted in three stages. In the first of the two-stage awareness trainings, entertaining and interactive activities were organized on topics such as the importance of pear fruit in terms of health, the effects of pesticides used in the production process, why we need new pear varieties?, and the development processes of new pear varieties. At the end of the section, two new pear cultivars, "ArTroya" and MarSalda," developed by MAREM, which are tolerant to fire blight disease, were especially emphasized, and additional information about them was given to the participants. In the second of the awareness activities, the participants visually examined the real hybrid fruit samples and experienced their flavors. In both sections, the activities were carried out face-to-face. The third part, organized to receive feedback, consists of award-winning competitions in the fields of story, picture, slogan, and logo design related to the "ArTroya" and MarSalda varieties of the participants. 383 original works produced by 240 participating students were evaluated with the content analysis method, and the "new pear variety perception" in their imagination was tried to be determined.

Results and Discussion

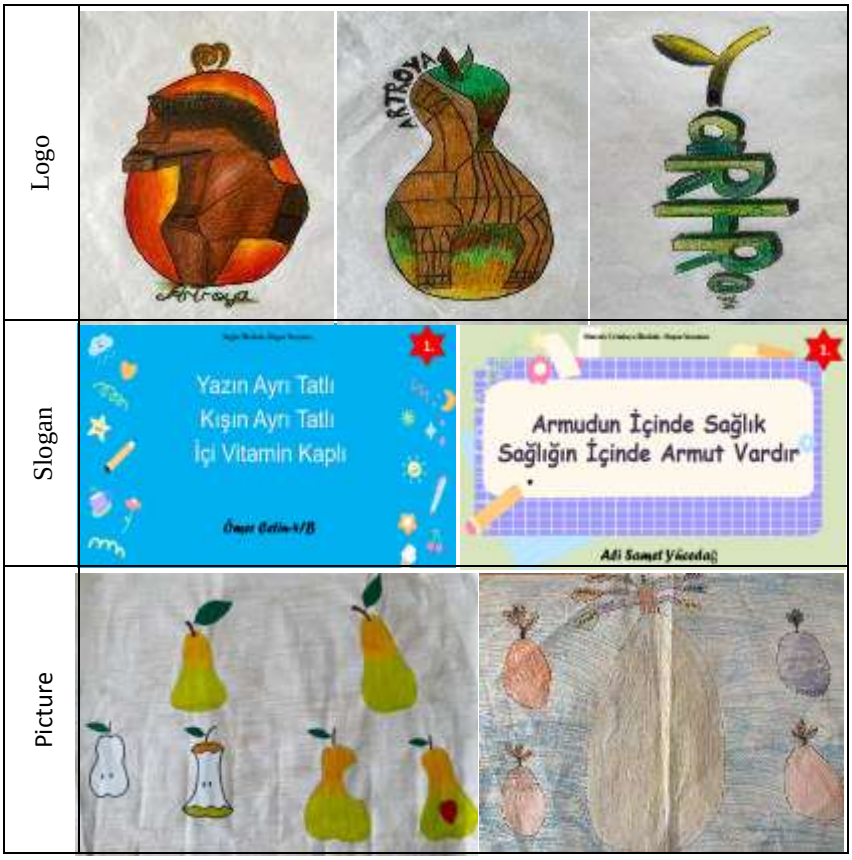
Awareness trainings

360 4th and 7th grade students attended the awareness training titled "My Pear" (Figure 1). In the content of the activity, the benefits of pear consumption and the problems experienced in the supply chain due to fire blight disease (tree losses and additional struggle costs for producers, increase in pear prices for the whole supply chain, negative effects of chemicals used in production on human health and the environment, etc.) were discussed. Afterwards, the participants examined the cultivar candidates developed within the scope of the MAREM pear breeding program visually and by tasting. All the students who participated in the activities stated that they participated in such a training for the first time and that "their perspectives have changed" about the pear fruit. Some of the students stated that they ate pears for the first time and that they would continue to consume pears from now on. A few of them stated that they do not consume pears due to their allergies. Before and during the trainings, the teachers and families of the participating students were actively interviewed, and it was observed that the activities were effective in the school and in the family. In this way, it is thought that there is a stronger possibility that the gains will be permanent.

Figure 1. “My Pear” awareness training.

Competition

The theme of the competitions was ArTroya and MarSalda varieties, where detailed information was given about their features in awareness activities. The students who participated in the trainings were asked to produce works in the fields of story, picture, slogan, and logo design for one of these two varieties that are tolerant to fire blight disease, registered in 2020. Some images of 383 works participating in the competitions are presented below (Figure 2).



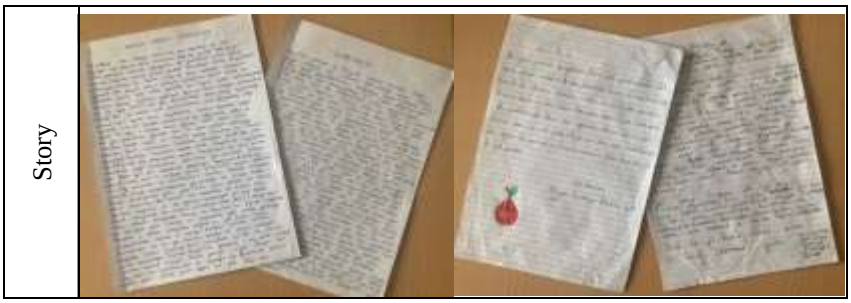


Figure 2. Some photos of the works in the competitions organized within the scope of "My Pear" awareness trainings.

The works were evaluated separately for each category at the school and grade level (4th and 7th grades) by the juries consisting of subject experts (Figure 3a), and their awards were presented at the ceremony held at the Fruit Research Institute (Figure 3a). Figure3b).

Figure 3. Evaluation of the works (a) and award ceremony (b).

The works prepared by the students within the scope of the competitions provided a rich content that could give an idea to the breeders about the future expectations about the pear. Some market information was also obtained from these contents (Figure 4).

(a) **(b)**

Figure 4. Word clouds a) student's expectations of appreciation regarding the internal and external quality of pear fruit, b) students' perceptions of pear fruit.

36,77% of the students defined new pear varieties as health, 35% as happiness, and 11.76% as the future. Other than these, 16.47% consisted of nature, Anadolu, and others (Figure 5).

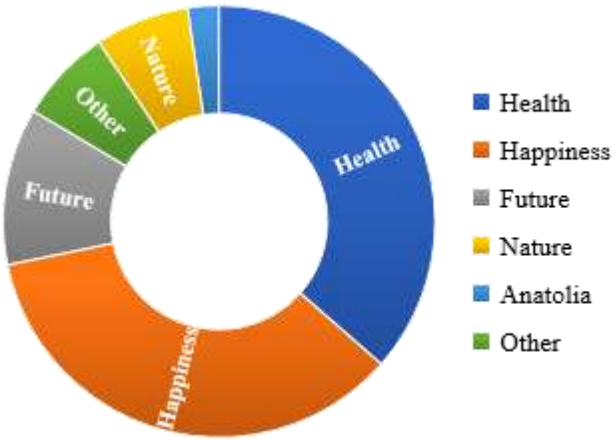


Figure 5. Distribution of future expectations

Figure 6 shows the students' expectations for the new varieties based on the sensory attributes of the pears. While 16% of the students stated that they wanted green pears, this was followed by red (16%) and yellow (12%) pears, respectively (Figure 6). Orange, pink, purple and blue colors other than these colors constituted 5% of the total color appreciation. Few of the students stated that they liked pears with oval and large fruit (Figure 6).

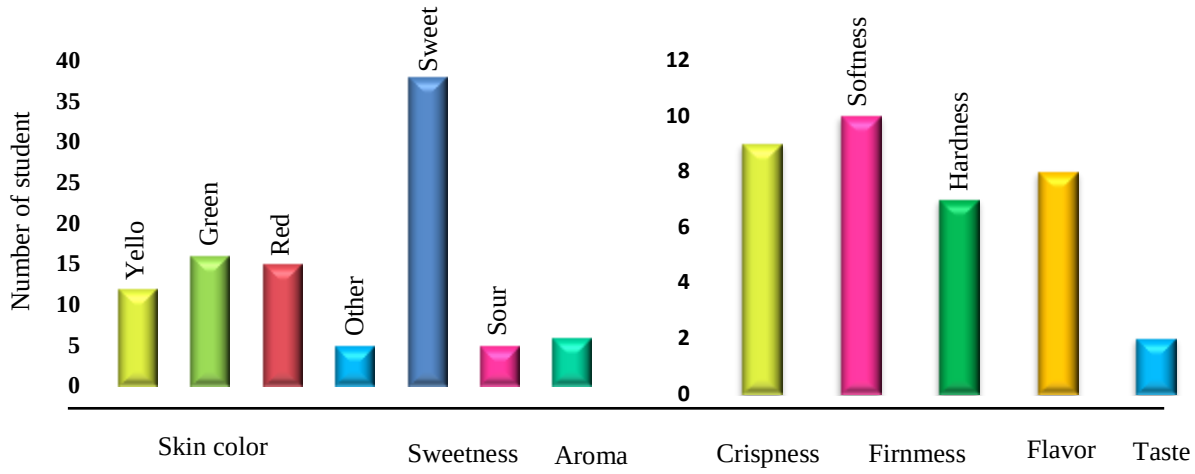


Figure 6. Students' internal and external quality appreciation levels.

Although the nutritional properties and health benefits of fruit are important to consumers, the eating quality of the fruit ultimately influences their decision to purchase it (Farruggia et al., 2016). It was determined that the students were more selective in terms of internal quality characteristics, and the majority of them (38%) preferred sweet pears. The level of appreciation for aroma and sourness was around 5%. While softness, which is one of the features affecting eating quality, had a share of 18% in taste, this feature was followed by crispness (16%), flavor (14%), and hardness (13%). Taste expectations were found to be low compared to other characteristics (Figure 6).

Conclusion

The consumption of pears, which is very beneficial for health, is relatively limited due to the low production amount, higher prices, and inconsistencies in fruit quality. This situation also leaves unanswered questions about what should be expected of pear fruit, especially in children. In the study, it was determined that children prefer traditional green- and yellow-colored sweet pears, and crispy or buttery pears can be consumed by this age group. In addition, they were found to be more innovative in terms of visual quality. These results can provide pear breeders with information on what the fruit quality should be. The works prepared in the competitions organized within the scope of the study have strikingly revealed the richness of children's imaginations. The mentioned works are quite original and can be used in marketing communication. It is thought that these and similar studies will contribute to an increase in the level of education and awareness in society, indirectly improving the quality of life and the sustainability of fruit production.

Acknowledgement

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