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Opinion

Apple Harvest and Problems in Turkey

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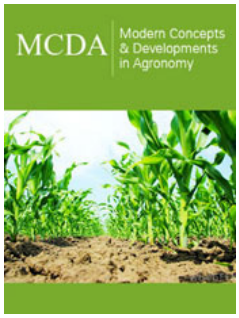

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Introduction

The homeland of apples is the South Caucasus Region, including Anatolia [1]. Apple is a widely cultivated species in the world and is the third most produced fruit after bananas and grapes in terms of production. World apple production was realized on an area of 5 290 thousand hectares and a yield of 16 800tons/ha was obtained [2]. According to 2018-year data, with a total number of 612 88 fruit bearing and 150 05 non-fruiting trees, Turkey's total apple production was 3 625 960tons, making it one of the top 5 countries in the World [3]. The number of apple varieties worldwide is 6500; in Turkey, it hits 460. Starking, Golden, Starkrimson and Amasya apples are mostly grown in Turkey, and most of the harvest is done by hand [4]. The reasons for this are; the fruits not ripening at the same time, the thermal-mechanical strength is weak and the sowing-planting distances are not suitable for mechanical harvesting [5].

The difficulties and problems encountered in apple harvest by hand

A. Loss of time and labour: First of all, the workers collect the fruits at the height they can reach by hand from the ground and the fruits on the high branches with the help of a ladder. Work efficiency is reduced by 70-80% when moving and installing the ladder from one tree to another during harvest [6]. Another harvesting job where time is lost is transferring the plucked fruit first to baskets or carrying bags, and then to crates and boxes. The worker spends 65-85% of the total harvest time on big trees in reaching and plucking fruit. In this harvesting method, it has been determined that 30-60% of the total production cost is allocated to the harvesting workforce [7,5].

B. Loss of quality: To preserve apple quality, it should not be picked up in the palm or squeezed with a finger while harvesting. However, this is not possible in manual harvesting. Damage to the apple occurs when the fruit falls from the tree, hits the tree branches during the fall, and falls on the holding surface or other fruit [8,9]. Damage is usually caused by static and dynamic external forces and may vary according to the moisture content of the material [10]. Since the harvested fruit maintains its vitality, the water loss in the damaged fruit accelerates and the respiratory temperature increases. As a result, the product loses its properties in a short time [9]. As a result of damage to the crushed and impacted parts of the fruit by infection with fungi, product quality and product value decrease and cause economic losses [11]. For this reason, quality losses in apples due to damage are high, in their study, they examined the diseases and losses caused by the adverse conditions during and after the harvest, during storage. At the end of the study, at the end of the first month, 19 damaged/diseased apples were identified from the 400 samples, while 45 damaged/diseased apples were identified from the subject with negative practices. In the 6th month when the counts ended, this rate was determined to be 81 and 196, respectively [12].

C. Occupational health and safety problems: It is common to harvest apples with the help of bags tied to the back or chest of the workers. When the workers put their cloth bags on the back, the filling mouth of the bag comes to the front. Three-stage bags can hold approximately 7.5-12.5kg of apples. The bottom of the bags can be opened to keep the damage to a minimum while unloading the apples into the crates. In his study the postures of the workers working in the apple harvest with these bags were observed and the workers' backs were bent, twisted, bent and twisted while picking the apples; It was determined that they worked in sitting, standing upright on one leg and squatting on one knee.

Some studies on apple harvest in Turkey

The main problem in manual harvesting is workforce management. Difficulties in finding workers and skilled workers, as well as changes in labor prices, directly affect the cost of harvesting and become the main problem for producers. Improvement of rapid harvesting potential conditions, reduction of problems such as worker hire and management are the advantages of mechanical harvesting [13]. There are some studies carried out in Turkey for mechanical harvesting. Modulus of elasticity and deformation volume were determined as harvest parameters of Amasya apple. They found the modulus of elasticity to be 1,62N/mm^2, and the deformation volume to be 2,02mm^3 [14]. A study on the harvest parameters of widely grown apple varieties in Turkey. In this study, the average Poisson ratio was 0.390 in Amasya apple, 0.382 in Golden apple, and 0.375 in Starking apple. The modulus of elasticity was determined to vary between 1,11-3,05N/mm^2 in the stem and flower regions [11]. In their study, they determined that the damage increased depending on the impact energy and the Starking apple variety was more sensitive to damage. It has been determined that the impact coefficient varies between 0.35-0.52 and the damage volume varies between 0.48-5.16cm^3 [15]. On the other hand, emphasized the importance of harvesting platforms in apple harvesting. It has been reported that these platforms can be used to reduce human movement during manual harvesting, minimize the time outside of harvesting, and reach optimum working conditions [16]. In terms of business, these platforms can be used in operations such as pruning and thinning, and their depreciation can be reduced [17].

There is almost no mechanical harvesting of apples in Turkey. However, in order to compete at the international level, it must immediately implement mechanical harvesting methods with the least damage and the lowest labour cost. All kinds of studies on this subject are needed.

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