

Problems Face to Organic Forage Plant Improvement and Their Recommended Solutions

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Abstract: As the world's population increases tremendously, mankind harmed the environment by applying different techniques to be able to close the deficit for food and consequently this resulted in the questioning of the effects of production techniques on food security, quality, animal welfare and their impacts on environment. Organic agriculture is developed with the help of policies that are driven by environmental and food safety. Organic livestock farming increased correlated to the increase of organic agriculture. However, getting healthy, safe and sound products from animals is only possible with the consumption of well qualified feed. Nowadays, unsatisfactory field productions, improper soil cultivation methods and more other obstacles which restrict the improvement of forage plants. In this review article, the current situation of cultivation in Turkey as well as in the world, imperfections and solution offers to those problems are stated.

Key words: Organic agriculture, organic forage plants cultivation

Organik Yem Bitkileri Yetiştiriciliğinin Sorunları ve Çözüm Önerileri

Öz: Dünya nüfusunun hızla artması sonucu insanoğlu ortaya çıkan gıda açığını kapatabilmek için değişik metotlar uygulayarak doğayı tahrip etmiştir. Bunun sonucunda üretimde kullanılan metotların gıda güvenliği, kalitesi, hayvan refahı ve çevre üzerinde olan etkileri sorgulanmaya başlanmıştır. Tarımsal üretimde çevre ve gıda güvenliğini esas alan ve destekleyen politikalar ile organik tarım geliştirilmiştir. Organik tarımdaki gelişme beraberinde organik hayvancılığın da artmasını sağlamıştır. Ancak hayvanlardan sağlıklı ürün elde etmek sağlıklı ve kaliteli yem tüketilmesi ile sağlanmaktadır. Günümüzde mevcut üretim alanlarının istenilen seviyede olmaması, yanlış toprak işleme uygulamaları gibi daha birçok problem organik yem bitkileri yetiştiriciliğinin önünde bir engel teşkil etmektedir. Bu makalede Dünyada ve Türkiye'de yetiştiriciliğin mevcut durumu, eksiklikleri ve bunlara getirilen çözüm önerileri belirtilmiştir.

Anahtar Kelimeler: Organik tarım, organik yem bitkileri yetiştiriciliği

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1. INTRODUCTION

The rapid increase in population and the concern of people to encounter serious risks related to nutrition have led them to seek different ways to increase the production of foodstuff at the risk of destroying the nature for production. Effects of the ways that are sought to increase the production on food safety quality, animal welfare and environment have come under question. The ecosystem has been ruined rapidly, and the foods which were produced as a result of improper agricultural practices caused serious health problems on people. Thus, healthy, safe and sound agricultural production and policies supporting those came into agenda and a kind namely organic agriculture was developed (Younie and Baars,2012; Hatipoğlu, 2013; Dellal et al.,2015).

The organic agriculture is based upon 4 basic principles i.e.; health, ecology, equity and care (Hatipoğlu, 2013). Organic agriculture has become one of the alternative and environment friendly production systems with an ever-increasing popularity in our country and also throughout the world. One of the basic reasons for the increase in interest towards organic agriculture is the occurrence of negative effects as a result of conventional agricultural practices.

By organic agriculture, environment and consumer health are also protected and a healthy generation is grown up by supplying healthy and free of risk foodstuffs to their tables without the side effects of pesticides and other chemical residues into them (Ertem and Çiçekli, 2010).

The improvement of forage clops is on of the most economic source in animal feeding within organic agriculture and meeting the nutrition needs by establishing organic stock development. Forage costs are among the most important inputs forming the production. In order to reduce that cost and make a profitable stock development, the most important issue is to buy quality fodder on cheap prices. Quality fodder source can be produced in every region of our country (Okcu, 2015). Aside from fodder production, establishments making organic animal production have the obligation to organically meet the animals' nutrition problems which are being occurred. Accordingly, the occurred organic forage problem is possible to remove by growing organic forage plants.

According to the data of 2016, it is reported that the world's organic production market volume is approximately 80 billion dollars. USA ranks first with 35.9 billion dollars while Germany ranks 2nd with 10.5 billion dollars and France ranks 3rd with 6.8 billion dollars (FIBL and IFOAM, 2016).

Organic product consumption per head in Europe is 11 dollars, while this ratio is identified as 0.1 Euro in Turkey. The reason behind why the amount of per head organic products consumption is low in our country is that the produced organic foods are expensive and consumers are not able to buy the desirable amount (FIBL and IFOAM,2016).

The data of 2016 show that the stock of, organic foodstuffs is established only in 23 cities of Turkey for a total of 1.215.632 animals (Anonymous, 2016). In order to make this animal production sustainable, nutrition problem should be eliminated by organic forage plant improvement.

2. THE SITUATION OF ORGANIC FORAGE PLANTS

According to the data of 2016, organic agricultural activities are maintained in 172 countries and on approximately 43.7-million-hectare field. Besides, 27.5-million-hectare field consists of meadow and pasture areas and 3.4-million-hectare field consists of organic forage plants. (Figure 1. Willer and Lernoud, 2016). Those figures state that approximately 70.8% of the current organic agricultural production area consists of organic roughage production areas in total, 63% of which consists of permanent meadow-pasture and 7.8% of organic forage plants production areas (Figure 2. Willer and Lernoud, 2016). In terms of organic agricultural activities, our country is one of the 10 countries that shows the highest increase and makes production on a 491 577-hectare area.

Figure 1. Worldwide distribution of total organic agriculture areas

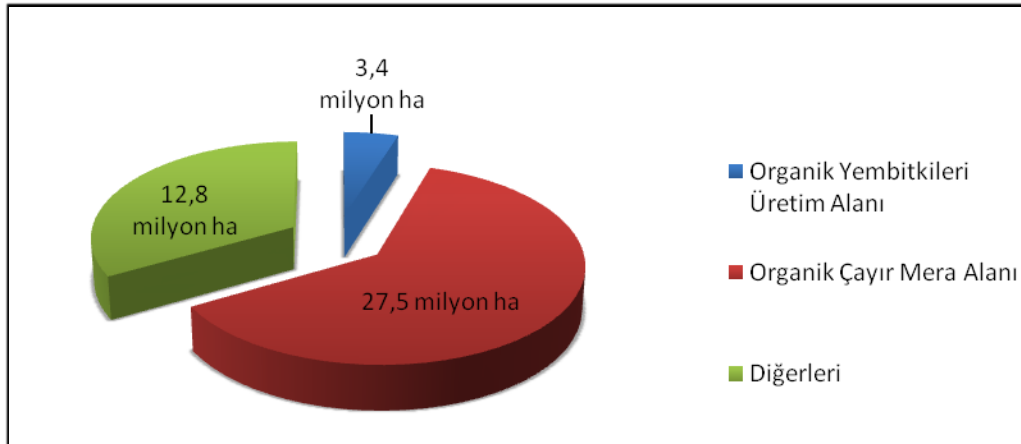
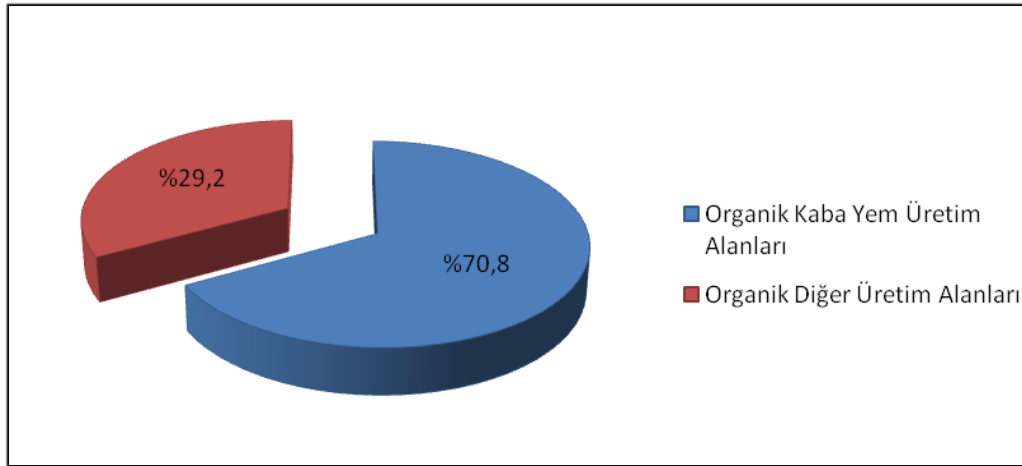


Figure 2. Share of roughage production areas in total organic agriculture areas around the world



The resources where the roughage are obtained cheapest and most convenient are grasslands (Töngel and Ayan, 2005; Nadir et al., 2012). If we check the permanent grasslands by continent which are on 27.5 million hectare area within current organic agriculture fields worldwide, we see that current organic agriculture areas consist of permanent grasslands at a rate of 97% in Oceania, 67% in Latin America and 42% in Europe (FIBL and IFOAM,2016). Another resource for roughage is the organic forage plant production areas. Products that are obtained in such areas are very important particularly in terms of organic stock development.

Establishments that make organic stock development have the requirement to also meet nutritional needs of animals organically. Thus, it is required that this nutritional problem emerged should be solved by organic forage plant growing. The importance of organic forage plant improvement is set forth once again in the obligation to constitute 60% of ration dry matter in organic animal production from roughage products, which was stated under Regulations Regarding Principals and Implementations of Organic Agriculture (Yolcu et al., 2014).

In our country, when the year 2016 data regarding organic forage plant are reviewed, it is seen that 292 609 tons of alfalfa (*Medicago sativa* L.), 98 291 tons of sainfoin (*Onobrychis sativa* L.), 65 316 tons of common vetch (*Vicia sativa* L.), 10 135.2 tons of silage corn (*Zea mays* L.), 121.2 tons of Bitter Vetch (*Vicia ervilia* L.), 80 tons of grasspea (*Lathyrus sativus* L.) were produced. When those data are considered, it is observed that the production shows an increase in each previous year, that roughage deficit reaches higher levels and therefore that organic forage plant improvement is an issue which should be overemphasized. In Schedule 1, production amounts of organic forage plants that are grown in our country by the year 2016 are presented (Anonymous, 2016).

When the year 2016 forage plant data are reviewed, the cities in top three in terms of organic clover, sainfoin, common vetch, silage corn and timothy grass are as follows; Muş (118480,8 ton), Van (77 289.1 tons) and Erzurum (41 949.1 tons) in organic clover production; Erzurum (21 288,7 tons), Van (21065.8 tons) and Ağrı (20207,5 tons) in organic sainfoin production; Kars (38 569.3 tons), Ardahan (10 647.2 tons) and Erzurum (6 630 tons) in organic common vetch production; Gümüşhane (3 836.4 tons), Erzurum (3 219.3 tons) and Çanakkale (637.7 tons) in organic silage corn production; Erzurum (10 546.4 tons), Van (8505.2 tons) and Ağrı (6742.6 tons) in organic timothy grass (Anonymous, 2016).

Table 1. Production Amounts of Organic Forage Plants in Turkey (2016)*

Plant Name	Amount of Organic Agricultural Production (tons)	Amount of Production At Transition Process (tons)	Total
Alfaalfa (<i>Medicago sativa</i> L.)	292609.5	45948	338557.5
Sainfoin (<i>Onobrychis sativa</i> L.)	98291	15273	113564
Silage Corn (<i>Zea mays</i> L.)	10135.2	6479	16614.2
Sorghum (<i>Sorghum bicolor</i> L.)	3.4	69	72.4
Common Vetch (<i>Vicia sativa</i> L.)	65315.7	15027	80342.7
Pasture	30759.2	19174	49933.2
Italian Ryegrass (<i>Lolium italicum</i> L.)	282.3	18	300.3
Forage Turnip (<i>Brassica rapa</i> L.)	179.7	300	479.7
Grasspea (<i>Lathyrus sativus</i> L.)	351.7	80	431.7
Forage Pea (<i>Pisum sativum</i> L.)	125.2	815	940.2
Bitter vetch (<i>Vicia ervilia</i> L.)	121.2	48	169.2
Total	498174.1	103231	601405.1

*Year 2016 Statistic Data of Ministry of Food, Agriculture and Livestock

3. PROBLEMS OF ORGANIC FORAGE PLANT BREEDING AND THEIR SOLUTIONS

The basic problems of organic forage plant improvement in our country are that the produced forages are far away from places where organic stock improvement is established, that there are no organic pastures, similar problems encountered in conventional production and problems specific to organic forage plant improvement.

Problems and Solution Recommendations for Organic Forage Plant Improvement

Insufficient cultivation areas for forage plants and low quality of the produced forages

Since Turkey has a very big potential in terms of animal existence, the importance of forage plants is very high in terms of stock improvement to meet the roughage deficit to emerge. Therefore, production areas of forage plants should be increased as well as training and demonstration works that will prompt forage plant production should be provided. For quality roughage production, forage plant improvement and certificated seed production, the required support should be supplied through contracted production.

Failing to perform forage plant improvement with types of forage plant and according to land structure

Selecting the types of forage plants suitable for the region is important in terms of improvement (for example; the dormancy group that is suitable for the ecologic structure of the region should be taken into consideration in selection of clover. In selection of silage corn, FAO maturity group should be taken into consideration) By considering vegetation period, determining the types of forage plants which might adapt to the region will positively affect the production. Besides, determining forage plant production areas according to their usage capability and quality indexes are also important.

Insufficient irrigation opportunities

Irrigation opportunities should be increased at the places of forage plant improvement and by prompting the usage of modern irrigation techniques, erosion and waste of water should be prevented.

Inadequate training and demonstration works

The breeders should be informed on forage plant improvement and their deficiencies on this subject should be met by focusing on demonstration works.

Failing to show sensitivity on organic fertilizer and fertilizing

It is needed that alternative fertilizing opportunities should be investigated, soil analyses should be done, nutrition elements which are deficit in soil should be given as fertilizer. This issue is important both to increase efficiency and for the health of herbaceous animals (Yolcu and Tan, 2008). It was reported that improvement of forage plants was an important practice in terms of organic fertilization, and that the nitrogen fixed to soil by legume was received by Poaceae (Gökkuş et al., 1999; Serin et al., 1997). Organic fertilizers such as barnyard manure and compost should not

be transported to the land before maturity. Accordingly, producers dealing with forage plant improvement should be given training on organic fertilizers and fertilizations well as brought in sensitivity awareness on fertilization.

Failing to improve alternative forage plants and insufficiency of crop alternation practice

Improvement opportunities should be provided for forage plants which might be included in production (Hungarian vetch and soy etc.). The producers should be informed of the plants to be alternative in this case in order to increase production design. Using of annual forage plants (silage corn, Hungarian vetch, common vetch, feed soy, grasspea, feed pea, phacelia) should be increased at crop alternation. Also when beekeeping potential of our country is taken into consideration, cultivation of plants such as sainfoin, canola and phacelia should be focused on.

Low grass efficiencies of grasslands

Pastures which are suitable for organic animal production should be improved and offered to service of animal production; and forage plants, particularly forage legumes, to meet the protein deficit in organic animal feeding should be focused on. The grazing period required for pastures which is stated in pasture law should definitely be obeyed. Grazing should be made up to the capacity the pasture can take and rotational grazing system should be enabled to be practiced. Forage plants seed production should be included in pasture improvement programs. Perennial plants available in pastures in bush form should be enabled to be grazed by proper animals.

4. CONCLUSION

Our country has a very big potential in terms of organic animal production. In order to maintain the activities of such animal production and make them competitive in local and international markets, quality and cheap forages should be supplied. In order to supply quality and cheap forage, organic forage plant production should be increased in cities where animal production is conducted intensively, the necessary measures should be taken to create organic pastures and bringing them in forage stock improvement as soon as possible, incentive and support of organic forage plants should be provided. Moreover, the scientific studies conducted in order to reach desired levels in production should be put into practice.

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