EFFECTS ON HAY YIELD AND QUALITY OF MIXTURE COMMON VETCH (*Vicia sativa* L.) AND BARLEY (*Hordeum vulgare* L.) IN BINGOL CONDITIONS

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Department of Field Crops

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Republic of Turkey
BINGOL UNIVERSITY
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FOREWORD

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LIST OF SYMBOLS AND ABBREVIATIONS

g	: Gram
kg	: Kilogram
da	: Decar
ha	: Hectare
km	: Kilometer
mm	: Millimeter
cm	: Centimeter
t	: Ton
N	: Nitrogen
P	: Phosphor
K	: Potassium
CP	: Crude protein
ADF	: Acid Detergent Fiber
NDF	: Neutral Detergent Fiber
CV	: Coefficient of Variation

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BİNGÖL KOŞULLARINDA ADİ FİĞ (*Vicia sativa* L.) İLE ARPANIN (*Hordeum vulgare* L.) KARIŞIM ORANLARININ OT VERİMİ VE KALİTESİNE ETKİLERİ

ÖZET

Bingöl koşullarında 2016 yılında yürütülen bu çalışmada adi fiğ (*Vicia sativa* L.) ile arpanın (*Hordeum vulgare* L.) karışım oranlarının ot verimi ve kalitesine etkileri incelenmiştir.

Çalışmada bitki materyali olarak Dicle Üniversitesi Ziraat Fakültesi Tarla Bitkileri Bölümünden alınan tescilli Görkem adi fiğ çeşidi ve GAP Uluslararası Tarımsal Araştırma ve Eğitim Merkezi Müdürlüğü'nden alınan tescilli Altıkat arpa çeşidi kullanılmıştır. Araştırma tesadüf blokları deneme desenine göre üç tekerrürlü olarak kurulmuştur. Araştırmada; adi fiğde sap uzunluğu, arpa bitki boyu, yeşil ot verimi, yeşil otta fiğ oranı, kuru ot verimi, kuru otta fiğ oranı, oransal verim toplamı, ham protein oranı, ham protein verimi, ham kül oranı, ADF ve NDF gibi özellikler incelenmiştir. İncelenen bazı özellikler arasında (adi fiğ sap uzunluğu ($P \leq 0,05$), yeşil ot verimi, yeşil otta fiğ oranı, kuru ot verimi, kuru otta fiğ oranı, oransal verim toplamı, ham protein oranı, ham protein verimi, ham kül oranı, asit deterjan lif (ADF) ve notr deterjan lif (NDF) ($P \leq 0,01$) istatistiki olarak önemli farklılıklar saptanmıştır.

Araştırma sonucunda; karışımların adi fiğ sap uzunlukları 50,40-61,33 cm, arpa bitki boyu 68,30-78,00 cm, yeşil ot verimi 683,78-1316,44 kg/da, yeşil otta fiğ oranı %5,19-100,00, kuru ot verimi 221,63-720,99 kg/da, kuru otta fiğ oranı %5,40-100,00, oransal verim toplamı 0,73-1,00, ham protein oranı %6,27-20,43, ham protein verimi 42,76-58,98 kg/da, ham kül oranı %6,86-11,41, ADF %30,93-33,89 ve NDF %46,96-62,69 arasında belirlenmiştir.

Bu çalışma sonuçlarına göre, Bingöl koşullarında en yüksek ham protein oranı ve en düşük ADF oranı bakımından en uygun karışımın %60 fiğ + %40 arpa karışımı olabileceği sonucuna varılmıştır.

Anahtar Kelimeler: Adi fiğ, arpa, karışım, ot verimi, ham protein oranı.

EFFECTS ON HAY YIELD AND QUALITY OF COMMON VETCH (*Vicia sativa* L.) AND BARLEY (*Hordeum vulgare* L.) MIXTURE RATES IN BINGOL CONDITIONS

ABSTRACT

In this study, hay yield and quality of common vetch (*Vicia sativa* L.) and barley (*Hordeum vulgare* L.) mixture rates were investigated under Bingol conditions during the 2016 growing season.

In the study, Gorkem common vetch variety obtained from department of Field Crops, Faculty of Agriculture, University of Dicle and Altikat barley variety obtained from GAP International Agricultural Research and Training Center were used as plant material. The research was established as a randomized complete block experimental design with three replications. Common vetch stem length, barley plant height, green herbage yield, common vetch rate in the green herbage, dry hay yield, common vetch rate in hay yield, relative yield total, crude protein ratio, crude protein yield, crude ash ratio, acid detergent fiber (ADF) and neutral detergent fiber (NDF) were analyzed. The results of variance analyses showed that there were statistically significant differences among some characters (vetch stem length ($P \leq 0.05$), green herbage yield, vetch rate in the green herbage, dry hay yield, vetch rate in the hay, relative yield total, crude protein ratio, crude protein yield, crude ash ratio, acid detergent fiber (ADF) and neutral detergent fiber (NDF) ($P \leq 0.01$).

Results of the research; vetch stem length of the mixtures from 50.40 to 61.33 cm, barley plant height from 68.30 to 78.00 cm, green herbage yield from 683.78 to 1316.44 kg/da, vetch rate in the green herbage from 5.19 to 100.00%, dry hay yield from 221.63 to 720.99 kg/da, vetch rate in the hay from 5.40 to 100.00%, relative yield total from 0.73 to 1.00, crude protein ratio from 6.27 to 20.43%, crude protein yield from 42.76 to 58.98 kg/da, crude ash ratio from 6.86 to 11.41, ADF from 30.93 to 33.89% and NDF from 46.96 to 62.69% were obtained.

Based on this study, of %60 vetch + %40 barley mixture may be concluded that the best mixtures in terms of the highest crude protein content and the lowest rates ADF for Bingol and similar ecological regions.

Keywords: Common vetch, barley, mixture, hay yield, crude protein ratio.

1. INTRODUCTION

Forage mixtures are common agricultural practices for the energy and protein needs of animals. Common vetch (*Vicia sativa* L.) and barley (*Hordeum vulgare* L.) mixtures in different seeding rates were investigated in terms of forage yield and quality.

Forage production is one of the most important for livestock problems we have. When we look at agricultural resources, herbal pastures are of great importance for animal feed in the feed production resources, and stand at the forefront of livestock which are mainly based on natural pastures. Natural resources that occupy 20% of our lands surface from (TUIK 2009) which we obtain our forage production for animals have been decreased because of our continuous use for centuries excessively and in a bad way.

Our forage production is far from meeting the demands for our country for animal breeding. Forage needs of livestock in our country carried out in a manner based on more pasture, as well as derived from cereal straw, waste and feed value as grazing the remaining stubble of the products of crops are available from very low supply. Although an increase in forage crops we get our cultivation and production although in recent years is very low. Devoted to forage crops cultivation in agricultural production system in our country is the 1 586 681 hectares, the proportion in the total field crops in terms of acreage is approximately 7.61% (TUIK 2009). Pastures and forage crops are essential to increase agricultural production in the fields of our pastures and to prevent excessive wear and grazing too early in order to obtain better quality feed for our animals. Technological and fodder cultivation area in the field of agriculture in most of the developed countries in terms of agriculture is over 25%. In fact, 53.6% in Australia, 53.5% in Denmark, 38.4% in the England (United Kingdom), 38.8% in the United States of America, 30.3% in France, while in Germany is 30.2% (Tükel and Hatipoglu 1997). If our most important natural resource is of our farmland, which if used in

accordance with the technical implementation of our sustainable production model is easier. The forage crops in field crop cultivation are the main factors of sustainable agricultural production.

Mixed cropping systems for different purposes are applied in the form of legume forage grasses growing. In this way it is possible to upgrade yield and quality made in mixed cropping unit area. Feed peas, white pea and vetch, barley plants such as wrapping to prevent bed, rye, seeded with grains such as triticale. Perennial forage crops, while in the first year seedlings circuits are very slow growing and cannot weed, this plant along with fast-growing cereals (companion plants) can supplement and in this way we would have struggled, though less in competition with weeds. This is also the first year plus companion plants feed efficiency breaks the crust may occur in the soil as it provides reduces the water and wind erosion. Forage crops are sown with other crops also grown in the field of agriculture. One year alfalfa and clover in the fields of grains with fallow system is applied as the Eastern Anatolia Region cultivated with cereals.

Intercropping had been neglected in research on plant production systems in Europe, possibly due to the complexity of these systems (Hauggard-Nielsen et al. 2009), but afterwards, in forage crop production, many intercropping systems were used for different purposes (Acar et al. 2006). This system allows lower inputs through reduced fertilizer and pesticide requirements, and it contributes to a greater uptake of water and nutrients, increased soil conservation, and high productivity and profitability (Lithourgidis et al. 2011; Akman et al. 2013) compared to monocrop systems.

Some factors affect the growth of the species used in intercropping, including cultivar selection, seeding ratios, mixture ratios, row spacing and competition between the mixture components (Dhima et al. 2007; Akman et al. 2013), extra work in preparing and planting seed, and crop management practices (Lithourgidis et al. 2011).

In vetch mixtures with cereals or grasses, it is necessary to know the ratios of the vetch and cereal/grass species (Albayrak et al. 2004; Balabanli and Turk 2006), because it affects the growth rate of the individual species in the mixtures as well as the forage yield and quality (Lithourgidis et al. 2006; Lauk and Lauk 2009). In the mixtures, for

example, an increased proportion of the cereal in its mixture with vetch significantly decreases the stand lodging, and has a positive influence on the forage yield, but the forage nutrient is of a poorer quality (Karagic et al., 2011), because a high cereal ratio in the botanic composition of legume + cereal mixtures causes low protein. (Mariotti et al. 2009) reported that cereals had a higher belowground competitive ability than legumes and legumes had a higher aboveground competitive ability than cereals in their mixtures, and that the competitive ability of the plants showed differences among the species. Between plant species, there may be aboveground competition for light and space, and belowground competition for water and nutrients (Mariotte et al. 2012). Thus, these competition conditions have important influences on the mixtures and these factors must be considered in this system.

The effects of different mixture ratios in the intercropping system have been evaluated in many studies. In these studies (Albayrak et al. 2004; Lithourgidis et al. 2006; Pinar 2007; Ozel 2010), increasing the ratio of those vetches whose forage quality was higher in the mixtures, increased the both forage yield and nutrient content, while some researchers reported the opposite findings; that increasing rate of the cereal/grass whose dry matter content was higher, resulted in a higher forage yield, but lower forage quality (Orak and Uygun 1996; Balabanli and Turk 2006; Tuna and Orak 2007; Dhima et al. 2007; Gunduz 2010; Bedir 2010). Moreover, the optimal forage yield and CP contents were obtained when the legume and cereal ratio was equal in the mixture (Basbag et al. 1999). After the harvest will be produced as well as quality roughage soil structure is improved. In addition, trees can be grown in the orchards grow forage land relations until total covering. Using fewer chemicals now in the world is made to achieve efficient and high quality products. In particular, organic corn and soybean farming, alfalfa and clover are planted one year in order to weed (Acar et al. 2006). A mixture of grasses + legume forage crops grown in order to achieve the intended benefits, the amount of seed in the mixture of species of the mixture must be adjusted very well. Accessing or a mixture of the expected target is very difficult.

This research; was established to determine common vetch + barley that can be grown under conditions in Bingol the optimal mixture ratios.

2. SUMMARY OF SOURCES

In Izmir conditions that grown in ecological vetch + barley and vetch + oat mixture vetch and cereal ratio of 50% + 50% or 66.6% + 33.3% is high forage yield, in the case of cultivated blend of the figures in the beginning of flowering, the barley mixture 791.5 kg/da, while the oat mixture of 783.8 kg/da was determined to obtain hay (Avcıoğlu 1979).

Legumes in Syria, mixture of grasses and rate in a study carried out to investigate the effects on the efficiency of weed seed amount; 8, 10, 12, 14, 16 and 18 kg/da of the amount of seed 20:80, 40:60, 60:40, 80:20, 100: 0 and 0: 100 ratio in the Figure, the highest seed yield 40:60 results Figure mixture ratio of 900 kg/da dry matter is obtained, it was reported that low yields of pure seed (Osman and Nersoyan 1983).

Cukurova in arid land based on randomized complete block design between the years 1983-1987, grown as a winter intermediates before cotton planting vetch. The format also barley grass yield and in a study conducted to determine the effects on botanical composition; hay yield values of 271-571 kg/da and ranged between, 46.24% of vetch proportion of green grass, and barley ratio is 53.76%, while the rate of vetch hay was determined that amounted to 57.04% of the barley rate was 42.06% (Hatipoglu et al. 1987).

Çukurova conditions for barley mixture with vetch in the study in order to determine the most appropriate ratio; the highest green herbage (1997 kg/da) and hay (419 kg/da) 80% vetch + 20% barley mixture of the yield of a containing, while the lowest yield was obtained from pure barley, and mixtures containing 50% or more vetch for hay it is recommended that the mixture of the highest protein yield of 75% vetch + 25% barley mixture (48.3 kg/da) has been reported to be obtained (Tükel and Yilmaz 1987).

In Samsun an annual legume plant + cereal mixture in a survey on; after the wheat harvest vetch + barley, vetch + oats, Hungarian vetch + barley, Hungarian vetch + oats, vetch + barley, vetch + oats, forage pea + barley, feed peas + oats mixture, mean the same as 853.50 kg/da, 830.93 kg/da, 757.80 kg/da, 911.85 kg/da, 8l9, l5 kg/da, 753.40 kg/da, 778.75 kg/da and 837.5l kg/da was obtained. Botanical composition with the same proportion of legumes as green grass in weight by 68.64%, 68.00%, 57.00%, 50.74%, 55.74%, 61.97%, 58,00% and 55.00%, respectively, in response to detecting, compared to the weight of dry matter, 66.60%, 67.00%, 54.64%, 49.l4%, 55.77%, 62.27%, 56.50% and 54.67% it is designated as. In the study, the botanical composition of the high crude protein content of the mixture is reported to be proportional to the increase rate of the legume (Büyükburç et al. l989).

In a study conducted at Cukurova arid conditions; 9 kg/da vetch + 3 kg/da barley mix 2452.4 kg/da of green forage yield, 440.1 kg/da dry matter yield is obtained, it has been identified of 48.9% and 43.0% respectively in dry green herbage and vetch rate. Vetch hay in the study showed an increase in the rate of barley decreased rate, according to figures of the barley harvest this situation is reported to contain more moisture due to the relatively (Hatipoglu et al. 1990).

A mixture of cereal with some kind of winter vetch grown in Harran plain in studies on the growing opportunities; according to the three-year mean, 75% vetch + 25% barley, 50% vetch + 50% barley and 25% vetch + 75% barley respectively of the mixture 2320.42, 2481.25 and 2497.08 kg/da of green herbage,746.92, 784.25 and 747.50 kg/da dry matter, 15.93%, 14.84%, and 13.47% the crude protein content, 47.75, 32.25 and 15.83% of green herbage where the rate of vetch decrease compared to October in the vetch in botanical composition in the harvest, the grains that grow, planting mix has been determined that an increase in plant height, stem length and based on pure plantation (Silber 1991).

In a survey carried out in winter; vetch + barley, vetch + oats and vetch + triticale compared to only cultivation of triticale mixture to be more efficient, 80: 20 mixture of the highest hay ratio (226.7 kg/da) and crude protein yield (37.46 kg/da) it is determined to provide. Mean 214.8 kg/da of pure planted vetch /hay, crude protein content of

18.05% and 39.08 kg/da crude protein yield was found to be obtained (Aydın and Tosun 1991).

Cukurova and barren land base in a survey; two years of the mixture trial in March, the second half of harvested vetch + barley mixture mean of 4,000 kg/ha of green forage yield given the base conditions for one annual ryegrass + vetch mixture of 2500 kg/ha of which have higher forage yield, still base conditions only 2500 kg/da of annual grass clover mixture Alexandria in green grass around it provides efficiency and stated that it was highly productive for the land planned to remain blank (Saglamtimur et al. 1991).

Some vetch species of barley, oats and triticale in mixtures with forage yield and efficiency of studies of the effect of the properties; the highest forage yield of triticale in the dry periods vetch, and in wet years is reported to be obtained from vetch + oat mixture (Soya et al. 1991).

Konya as a second crop in some legume forage crops and irrigated conditions of 75% legume + 25% cereal seed pure grain grown as a mixture of annual in research; vetch + barley, vetch + oats, vetch + barley, vetch + oats, forage pea + barley and forage peas + oats, green and dry matter yield of the mixture, respectively, per decare in 2392.11 kg, and 461.76 kg, 2496.64 kg and 466.40 kg, l8l0,33 kg and 347.93 kg, l744,55 kg and 359.14 kg, l933,87 kg and 358.14 kg, 2255.28 kg and 409.59 kg, was determined as crude protein content in the mixture the same respectively l5.76%, l7.25%, l5.20%, l4.88%, l5.67% and l6.4l%, crude protein yield 67.75 kg/da 72.88 kg/da, 48.5l kg/da, 47.44 kg/da, 49.14 kg/da and 60.38 kg/da it has also been reported. In the study, the green grass obtained from 75% legume + 25% cereal mixture in the botanical composition by weight legumes rates in feed peas + barley 85.6%, feed peas + oats 81.1%, in common vetch + barley 86.6%, common vetch + oats 84.0%, vetch + barley 78.0% and vetch + oats 64.6% are reported to have been identified as (Acar l995).

Intermediates can be grown as a winter vetch in the South-eastern Anatolia Region carried out a research on vetch + barley mixtures; in the long plant height 75% vetch + 25% barley mixture, the longest length of barley is found in pure barley. The highest forage yield (2782 kg/da) 33% vetch + 66% barley mixture, while obtaining the highest

hay yield of barley in pure sowing, and the lowest hay yield was determined from the common vetch in pure sowing. Vetch seed mixture in the ratio increases vetch hay yield increased participation rate of the mixture and 75% vetch + 25% barley mixture was found to be 7.3%. In the study; the figures in the mixture for high yield should be cut by 50% the time of flowering, mixed planting vetch plant in a non-statistically significant increase in length, the barley plants were found to be decreased in length (Arslan and Gülcan l996).

Vetch + barley mixture ratio of forage yield and quality of the research conducted to investigate the effect; the highest forage yield (5103 kg/da) 70% vetch + 30% barley mixture, the highest dry matter yield (753.1 kg/da) and crude protein yield (131.3 kg/da) and 60% vetch + 40% barley mixture was obtained (Bugdaycigil et al. l996).

Erzurum in aqueous conditions vetch + barley and vetch + oats mixture in the research underway on the; vetch, which replaces the grains of the mineral composition of the herbs included in the mixture to avoid going to bed, especially Ca, Mg and P rate reduction and tetany (K/Ca + Mg) ratio was found to be causing the increase, so it would be appropriate to lower the grain mixing ratio and 75% vetch + 25% grain mixture of have been reported as the most suitable mixture (Tan and Serin l996).

In Hatay ecological vetch + barley mixture it can be grown in conditions in a study to determine the optimal mix ratio and time format; the highest age hay yield (3970 kg/da) and the highest hay yield (801.9 kg/da) values were obtained from 75% vetch + 25% barley mixture harvested on 15 April (Yilmaz et al. l996).

Çukurova conditions 1995 / 96-1996 / 97 breeding periods, different sowing and harvest time in barley by 75% vetch + 25% barley by 5 mixture entering vetch cultivars, the research conducted to determine the effect on the properties related to forage yield; According to the two-year mean, the vetch entering into the mix with barley flowering at the beginning of hairy vetch (Menemen-79), plant height of 94.4 cm, common vetch (Kubilay) plant height of 85.0 cm, common vetch (Karaelçi) plant height of 84.2 cm as it was determined. Vetch mixture into barley plants that ranged from 96.3 to 102.3 cm in length have been reported vetch hay while the ratio of the two-year mean based on

the beginning of flowering in hairy vetch (Menemen-79) 46.32%, the common vetch cultivars (Kubilay) 37.07% ,(Karaelçi) was found to be 32.07%. According to the two-year mean flowering at the beginning of the harvest mixture of hairy than vetch (Menemen-79) 758 kg/da, while the common vetch cultivars (Karaelçi) 729 kg/da, (Kubilay) 636 kg/da dry matter yield was reported to be obtained (Yakutbay 1997).

In the Amik plain conditions common vetch + cereal mixtures grown in with different proportions of certain species in a study conducted in order to determine the most appropriate type and mixing ratio of grain; cultivation in the form of a mixture of pure planting gave higher yield, the highest forage yield of 75% vetch + 25% oat of the mixture (3682.0 kg/da), the lowest forage yield of pure triticale the plot (1293.0 kg/da) and the 75% vetch + 25% oat mixture of the high hay yield of the (558.3 kg/da) were found to be achieved. In the study; the highest crude protein yield 75% vetch + 25% grain mix, plant height, the highest value detected in barley is reported that 50% vetch + 50% barley mix ratio (Yilmaz 1997).

Between 1995-96 and 1996-97, a study conducted in Cukurova conditions; the different sowing and harvest time, according to the varieties of hay yield 75% vetch + 25% barley mixture of 708-908 kg/da and crude protein yield from 79.1 to 119.23 kg/da in the exchange, the highest dry matter and crude protein yield it is obtained from a mixture containing the hairy vetch, in early October high vetch and vetch hay while the crude protein, in late October it was reported that the total dry matter yield higher too (Yatkubay and Anlarsal 2000).

Erzurum aqueous conditions study conducted in 1997; vetch (Karaelçi) and barley (Tokak 157/37)'s alone and seed yield of mixed cropping and some of the features examined and ordinary mean plant height of 51.80 cm vetch, the mean crude protein content was found to be determined as 26.30% in vetch (Bakoğlu and Memis 2002).

Research conducted in Konya in order to train as a second product of some legume forage and cereal mixture; pure cultivated parcels of 63.24 cm vetch, 74.75 cm barley plant height is obtained, 1203.95 kg/da vetch in pure sowing, while barley, 2308 kg/da of green grass is obtained, pure plantation 24.28% vetch 25.77% barley hay rate

achieved while 291.60 kg/da vetch and 586.70 kg/da of barley hay yield is obtained, protein content is derived as 8.38% for barley, while 15.62% in common vetch, raw pure plantation the protein yield vetch at 46.42 kg/da for barley 50.07 kg/da as it is identified. In the study, legumes of forage and grain mix: 25:75%, 50:50% and 75:25% vetch+barley. In his study on barley rates were 61.95 cm, 59 cm and 66.22 cm vetch plant height is obtained, barley the length respectively 78.25 cm, 75.64 cm, which were obtained as 73.10 cm, respectively green herbage yield 2157.25 kg/da, 2255.95 kg/da and 1628.35 kg/da, while 25.85%, 25.78% and 22.13% with hay ratio 557.50 kg/da, 582.45 kg/da, 359.60 kg/da dry matter yield was received, and the botanical composition of the mixture 10.17%, 15.44%, and 23.75% which is obtained, mixture of the parcel 10.33%, 13.30% and 14.32% crude protein content is obtained, 58.57 kg/da, 77.35 kg/da and 52.33 kg/da crude protein yield obtained has been reported (Kerimbek and Mulayim 2003).

In the province of Konya made in agriculture and the work carried out to determine the different mixtures with different barley varieties newly registered vetch; the highest forage yield (2160 kg/da), dry matter yield (450.50 kg/da) and crude protein yield (77.50 kg/da) 50% vetch + 50% barley mixture is derived from, in terms of crude protein content the best mixture 18.21%,with 75% vetch + 25% barley mixture consisting of , producers aiming high herbage yield in irrigated conditions in Konya 50% vetch + 50% barley is reported to be offered of blend (Arslan 2012).

Kahramanmaras conditions in 2010-2011 grain growing season, barley (*Hordeum vulgare* L.) and common vetch (*Vicia sativa* L.) plants pure and a 50% mixture of bacteria (*Rhizobium leguminosarum* L.) and a study conducted by making the bacterium practices; inoculated just as important as the statistical rate of dry matter, while the other features that improve the efficiency and quality of content of grass plants, but is reported to be negligible. In the research and statistics as to the important features of the highest hay yield (708.7 kg/da) pure barley planting, biological yield (1991.2 kg/da) of a mixture of cropping systems, the crude protein content (23.93%) of pure the vetch seed, dry matter content (88.56%) were found to be obtained from the planting mix (Uzun and İdikut 2012).

3. MATERIALS AND METHODS

3.1. Material

3.1.1. Organizations that provided the studied calligraphy and type

Dicle University Faculty of Agriculture working as plant material obtained from the Department of Field Crops glory common vetch and GAP International Agricultural Research and Training Centre Directorate of Altikat barley varieties obtained was used.

3.1.2. Trial Location Features

Genc vocational school in dry conditions in this research field trial was carried out of high school in 2016.

3.1.2.1. Features of Climate Research Area

Table 3.1. The mean monthly values of some climate for long years (2000-2015) and 2016 at Bingöl

Months	Average Temperature (°C)		Total Precipitation (mm)		Relative Humidity (%)	
	Long Years	2016	Long Years	2016	Long Years	2016
January	-2.4	-2.8	136.0	256.8	72.3	75.2
February	-1.5	2.3	136.4	113.0	72.1	72.5
March	3.8	7.1	129.1	131.0	67.0	58.9
April	10.7	14.3	120.5	46.8	62.8	47.0
May	16.3	16.5	75.8	66.2	55.8	55.9
June	22.1	23.3	21.2	34.4	43.7	43.5
Total/Ave.	**8.2**	**10.1**	**619.0**	**648.2**	**62.3**	**58.8**

Source: Anonymous 2016 Total Directorate of Meteorology (Bingol)

The climatic data of Bingol province are given in Table 3.1. The mean temperature in the first six months for long years, as shown in the table 8.2 ^{o}C Bingol. For long years, according to the mean in the coldest month January is the hottest month of June. In contrast, the mean temperature in the first six months of 2016, a survey was made 10.1 ^{o}C, the coldest month in January, was recorded as the hottest month of June. The first six months of 2016, the study was only mean temperatures, lower the 0 ^{o}C in January, February, March, April, May and June had higher temperature average. Accordingly, has been higher than the mean for long years to for the first six months of 2016, the province of Bingol said to be hotter than a year for long years.

2016 in February, April and May, for long years has fallen to less rain than the total amount of precipitation. The first six months of 2016 the total amount of rainfall for long years are understood to be higher than the total in the first six months.

Relative humidity values of the mean for long years, while 62.3% of this value was 58.8% in the first six months of 2016 and for long years has been lower than mean. As a result, for many years Bingöl compared to the first six months of 2016, warmer, less humid and rainy it was more than a year.

3.1.2.2. Soil Properties of Research Area

Soil samples were taken from depth 0-20 cm of the field and testing soil at Bingol University Faculty of Agriculture Soil Science and Plant Nutrition in Laboratory and after analytical obtain result, while in the consideration Table 3.2.

Table 3.2. Trial lot of soil properties

Texture	Saturation (%)	Salinity (%)	Organic Matter (%)	$CaCO_3$ (%)	K_2O (kg/da)	P_2O_5 (kg/da)	pH
Loamy	38.38	0.0034	0.26	0.55	22.52	12.17	7.22

As seen in the table, a work area with a loamy soil structure, the absence of salinity problems have been identified and if the soil pH is around neutral. Organic matter content

is very minimal, insufficient levels of lime and potassium content, and the phosphorus content was determined to be more than level.

3.2. Method

3.2.1. Trial Method

Research was conducted between April 2016 and June 2016. The field experiment operations of planting on April 7, the harvest was made June 20. Field experiment was a randomized complete block design with 3 replications pattern. Trial plot size was determined to be 8.4 m * 5 m = 42 m^2. Trial hand with the help of the marker sequence in the opening 5 m long with an interval of 20 cm were planted in 4 rows. 20 kg per decare of barley and 10 kg per decare of vetch seed were to be used. Trial before planting over 4 kg of pure substance per decare nitrogen (N), 8 kg of phosphorus (P_2O_5) are given fertilizer.

After planting, weed control is done throughout the growing season with a diameter in the plot. Experimental plots the observations described below to determine the output characteristics and operation are chosen at random from each plot were conducted on 5 plants and as described below.

3.2.2. Investigation Features

3.2.2.1. Common Vetch Stem Length (cm)

Each parcel was conducted in randomly selected 5 common vetch plants. In the stem length of common vetch according to the method conducted by Anlarsal (1987); as measured in cm from the soil surface with end buds. 5 common vetch mean of the measured stem length measurements were taken and each plot was calculated that the mean length of the common vetch handle for the parcel.

3.2.2.2. Barley Plant Height (cm)

Each plot is made of randomly selected five barley plants. Barley plant height measurement; according to a method described by Yağbasanlar (1987); was measured as recent spikes with the soil surface. The mean size of the measured five barley plants in each plot was measured and it was recorded as a mean barley plant height for the parcel.

3.2.2.3. Green Herbage Yield (kg/da)

Weed harvesting in the trial; ordinary figures have been made in the period when the lower pods are formed. Before the format process; 4 rows in each plot thrown in each of 50 cm edge effect as the two sides and parcel of the head and cut out the help of a net area of 1.6 m^2 sickle. Each parcel harvested from the clear space scales weighed with green herbage, the forage yield was determined for the parcel. Then the parcel is converted into green herbage yield per hectare forage yield.

3.2.2.4. The Rate of Common Vetch in Green Herbage (%)

Each mixture of herbs harvested from plots; ordinary divided into components, including vetch, barley and green weight of each component is determined. Common vetch green herbage weight determined for each parcel, the parcel in question by dividing the total forage yield, common vetch was determined as the ratio (%) of green herbage.

3.2.2.5. Dry Hay Yield (kg/da)

Each parcel harvested green herbage and 0.5 kg vetch and 0.5 kg of barley which is divided into components in the green herbage samples drying cabinet at (70 °C, for 48 hrs.) and dried until the weight becomes constant. Examples of dry herbage hay yield and weight were determined parcel common vetch necessary transformations are applied and barley hay yields were determined. The total comes to barley hay yield with each common vetch hay yield is calculated as the sum determined in the parcel to parcel hay yield. Then parcel hay yields are converted to hay yield per decare.

3.2.2.6. Vetch Rate in Dry Hay (%)

Each mixture common vetch hay yield is determined in the plot, such as hay common vetch rate in % and the proportion of the total parcel hay yield is calculated.

3.2.2.7. Relative Yield Total (RYT)

It raised only the species comprising the mixture according to mixture relative yield total accepted as a measure of the effectiveness of use of ecological resources, De Wit and Van den Bergh (1965), hay yield of mixtures utilizing the following formula described by the calculated basis.

RYT = YFA / YFF + YAF / YAA
RYT = Relative yield total
YFA = the mixture of common vetch hay yield
YFF = pure planting of hay yield of common vetch
YAF = hay yield in barley mix
YAA = pure sowing of barley hay yield

3.2.2.8. Crude Protein Ratio (%)

In each for the sake of identifying the dried grass for each sample that taken by Kacar (1977) nitrogen analysis has been done. % Nitrogen values determined in samples multiplied by coefficient 6.25% crude protein content in each sample was calculated. Every parcel in the value of crude protein content determined for each mixture component utilizing the following equation crude protein content of the weed was found in each plot.

Crude protein content of the herbage in the plot = (x vetch crude protein content in the seed exchange rate) + (x crude protein content of barley grass in exchange rates).

3.2.2.9. Crude Protein Yield (kg/da)

Each parcel crude protein content of hay crude protein yield value determined by multiplying the parcel with the necessary conversions performed per hectare yield and crude protein yield was calculated.

3.2.2.10. Crude Ash Rate (%)

In the time of burning the dry material, those which remain unburned are all called 'ash' (Kutlu 2008). The dry seed can be identified by burning the dry matter in the combustion furnace at 550 °C for the duration of 12 hours.

3.2.2.11. ADF (Acid Detergent Fiber) Rate (%)

ADF (Acid detergent fiber) solution was prepared for analysis. Filter bags weighed empty. Then 1 mm sieve diameter of about 0.5 g of the ground sample is placed in the mill with the weighing bag and closing the mouth of the bag is weighed. Samples weighing device (ANKOM 200 Fibre Analyzer) is placed and the prepared solution is added and activated. At 100 °C, 60 minutes after boiling samples 5 minutes and rinsed once with cold water, twice with hot water, acetone and then allowed to stand for 3 minutes. When allowed to stand at room temperature in a desiccator oven at 105 ºC for 2-4 hours after evaporated the acetone is calculated by weighing a sample of formula (Van Soest 1963).

3.2.2.12. NDF (Neutral Detergent Fiber) Rate (%)

The solution to the NDF (neutral detergent fiber) analysis is prepared. Filter bags weighed empty. Then weighed mouth closed after the bag set to about 0.5 g of sample milled in the mill with a diameter of 1 mm sieve. Samples weighing device (ANKOM 200 Fibre Analyzer) is placed and the prepared solution is added and activated. 100 °C, then boiled for 60 min, 5 min, rinsed twice with cold water, once with hot water and allowed to stand in acetone for 3 minutes. When the acetone was evaporated, 105 °C is

kept in the oven for 2-4 hours in a desiccator down to room temperature the samples are calculated by weighing the formula (Van Soest and Wine 1967).

3.2.3. Statistical Models and Assessment Methods

Randomized block design with three replications JUMP statistical package program with the help of statistical analysis of data for the examination was conducted in accordance with the character designs. Botanical composition in which data are expressed as ratio of vetch (%), the angle transformation is applied before applying analysis of variance. Statistically significant; according to the mean factor analysis of variance ANOVA results were compared with Least Significant Difference (LSD) test.

4. RESULTS AND DISCUSSION

4.1. Common Vetch Stem Length (cm)

Pure vetch and vetch + barley mixture of four different measured values vetch stem length of the plot analysis of variance results are given in Table 4.1.

Table 4.1. Pure vetch and vetch + barley mixture in the mixing ratio of the variance analysis results regarding the effects of stem length vetch

Variance Source	Degree of Freedom	Squares Total	Squares Average	F Value
Repetition	2	86.46933	43.234665	0.0583
Mixture Ratio	4	210.99733	52.7493325	0.0250*
Error	8	83.53067	10.4413338	
General	14	380.99733		

* Marked F values is important 5% (P≤0.05).

As seen from the table, the mixing ratio of the length of the stem vetch is understood that the 5% level statistically significant effects. Determined in different mixtures vetch mean stem length are given in Table 4.2.

Highest common vetch stem length, as seen in Table 4.2. is 61.33 cm from with 20% vetch + 80% barley mixtures was obtained containing, 60% vetch+ 40% barley mixture in the same group are statistically it followed parcels containing. The lowest common vetch stems length 50.40 cm comprising 80% vetch + 20% barley mixture was obtained from the plot. Mixtures in different proportions of ordinary pure vetch and vetch mean stem length was determined to be 55.45 cm.

Different values for the common vetch stem length in studies related vetch + barley mixture in various regions of Turkey were obtained. For example, we get about vetch

stem length values (Acar 1995) by 116.44 cm, (Arslan and Gülcan, 1996) by 63.25 cm (Yakutbay 1997) by 85.0 cm and (Kerimbek and Mulayim 2003) while lower than the value obtained as 63.24 cm; (Bakoğlu and Memis 2002) by 51.8 cm, (Karaca and Cimrin 2002) by 28.5 cm and (Nadeem et al. 2010) is higher than the value obtained as 46.3 cm and (Arslan 2012) by a 58.46 cm the values obtained are similar to meat. We made the cause of the differences between working with other research, the varieties used, the mixing ratio can be said to be caused by the soil and climatic factors or execution of work is different.

Table 4.2. Detected in stem length in different vetch + barley mixture (cm) mean

Mixture Ratios	**Vetch Stem Length (cm)**
100% Vetch	55.07 BC
80% Vetch + 20% Barley	50.40 C
60% Vetch + 40% Barley	57.47 AB
40% Vetch + 60% Barley	53.00 BC
20% Vetch + 80% Barley	61.33 A
Mean	**55.45**

Means shown in the same letter from one another according to the LSD test P≤0.05 error limits are statistically indistinguishable.

4.2. Barley Plant Height (cm)

Pure barley and vetch + barley mixture of four different measured values of the barley plant height variance analysis results are given in Table 4.3.

Table 4.3. Pure barley and vetch + barley mixture in the mixing ratio of the barley plant ANOVA analysis regarding the effect of size

Variance Source	Degree of Freedom	Squares Total	Squares Average	F Value
Repetition	2	103.90533	51.952665	0.1644
Mixture Ratio	4	207.17067	51.7926675	$0.1499^{N.S.}$
Error	8	182.14133	22.7676662	
General	14	493.21733		

N.S.: marked F value of 5% (P≤0.05) it is no significant.

As seen from the table, the length of barley mixture ratio is understood didn't affect statistically significant level. Determined in different mixtures barley plant height means are given in Table 4.4.

Vetch + barley mixtures as shown in Table 4.4. ranged from 68.30 cm to 78.00 cm. Pure barley and barley plant height mean of the plant height in the mixing ratio in different ratios was determined to be 71.01 cm.

Different values for the common vetch + barley plant height in studies related to the barley mixture in various regions of Turkey were obtained. For example, barley values we obtained regarding the size, (Arslan and Gülcan 1996) by 80.17 cm and (Yakutbay 1997), while lower than the value obtained as 102.3 cm; (Acar 1995) by 52.22 cm, (Karaca and Cimrin 2002) by 44.8 cm and (Nadeem et al. 2010) by 66.9 cm higher than the value obtained as (Kerimbek and Mulayim 2003) by 74.75 cm, (Arslan 2012) are similar to values obtained by a 72.6 cm. Our findings are the result of differences between the findings of other researchers, the varieties used, the mixing ratio can be said to be caused by the soil and climatic factors or execution of work is different.

Table 4.4. Pure barley and vetch + barley mixture plant height in different detected in (cm) mean

Mixture Ratios	**Barley Plant Height (cm)**
100% Barley	68.30
80% Vetch + 20% Barley	78.00
60% Vetch + 40% Barley	71.70
40% Vetch + 60% Barley	68.77
20% Vetch + 80% Barley	68.30
Mean	**71.01**

4.3. Green Herbage Yield (kg/da)

Pure sowing barley and vetch mixture of four different forage yields as a result of analysis of variance of the values measured in the plots are given in Table 4.5.

As seen from the table, the mixing ratio of herbage yield statistically significant at the %1 level is understood that a very significant impact. Determined in a different mix of green forage yield Means are shown in Table 4.6.

Table 4.5. Vetch + barley mixture ratio of the blend in the analysis of variance results related to the effect of green herbage yield

Variance Source	Degree of Freedom	Squares Total	Squares Average	F Value
Repetition	2	3610.27	1805.135	0.5128
Mixture Ratio	5	891809.60	178361.92	0.0001**
Error	10	25262.91	2526.291	
General	17	920682.79		

** Marked F values is important of 1% (P≤ 0.01).

The highest forage yield as shown in Table 4.6. that 1316.44 kg/da was obtained from pure barley parcel, while the lowest green herbage yield of 683.78 kg/da with 80% vetch + 20% barley were obtained from a mixture parcel containing. Pure green herbage cultivation and mean yield of 824.41 kg/da of mixture in different ratios as have been identified.

Table 4.6. Green herbage yield determined in different vetch + barley mixture (kg/da) mean

Mixture Ratios	**Green Herbage Yield (kg/da)**
100% Vetch	794.67 B
100% Barley	1316.44 A
80% Vetch + 20% Barley	683.78 C
60% Vetch + 40% Barley	716.67 BC
40% Vetch + 60% Barley	720.44 BC
20% Vetch + 80% Barley	714.44 BC
Mean	**824.41**

Means shown in the same letter from one another according to the LSD test P≤0.01 error limits are statistically indistinguishable.

Studies on Turkey's pure plantation and common vetch + barley mixture in different regions have different values were obtained on forage yield. For example, we get on the green herbage yield values (Yilmaz and Tükel, 1987) by 1997 kg/da, (Hatipoglu et al.

1990) 2452.4 kg/da, (Silber 1991) by 2497 kg/da, (Sağlamtimur et al. 1991) by 4000 kg/da, (Acar 1995) by 2392 kg/da, (Arslan and Gülcan, 1996) by 2782 kg/da, (Buğdaycıgil et al. 1996) by 5103 kg/da, Yilmaz et al. (1996) by 3970 kg/da, (Yilmaz 1997) by 3682 kg/da, (Kerimbek and Mulayim, 2003) by 2255 kg/da, (Nadeem et al. 2010) by 3158 kg/da and (Arslan 2012) by 2160 kg/da as while lower than the value obtained; (Karaca and Cimrin 2002) by 668 kg/da was found to be higher than the value gained. Our findings are the result of differences between the findings of other researchers, the varieties used, the mixing ratio can be said to be caused by the soil and climatic factors or execution of work is different.

4.4. Vetch Rate in Green Herbage (%)

Pure vetch and four different vetch + barley mix of green herbage on the results of analysis of variance measured by the value of vetch plots are given in Table 4.7.

Table 4.7. Vetch + barley mixture in the green herbage of the mixture ratio variance analysis results regarding the impact of the rate of vetch

Variance Source	Degree of Freedom	Squares Total	Squares Average	F Value
Repetition	2	0.828	0.414	0.7949
Mixture Ratio	4	10963.023	2740.75575	0.0001**
Error	8	14.025	1.753125	
General	14	10977.877		

** Marked F values is important 1% (P≤0.01).

As seen from the table, the green herbage that contains mixture ratio and it is understood that the statistically 1% has a significant impact. Vetch mean rate on green grass detected in different mixtures are given in Table 4.8.

As shown in table, the highest rate of vetch 100% pure vetch in the green herbage angle value 5.19% parties obtained and while the lowest rate of 20% vetch + 80% barley mixture and in green herbage were from the of plots pure vetch and different mixing ratios in the green herbage the mean of vetch rate is found to be angle value 35.19%.

Studies on Turkey's mixture of barley, vetch was obtained in different regions with different values for the ratio of vetch green herbage. For example, we get about vetch rate of herbage values (Hatipoglu et al. 1987) by 46.24%, (Büyükburç et al. 1989) by 68.64%, (Hatipoglu et al. 1990) by 48.9%, (Silber 1991) by the 47.75%, (Acar 1995) by the 86.6%, (Arslan 2012) by 61.9% and (Karaca and Cimrin, 2002) by 55.1%, while lower than the value obtained in; (Arslan and Gülcan 1996) by 7.3% and (Kerimbek and Mulayim, 2003) is consistent with the values obtained in 10.27% to 23.75%.

Table 4.8. The ratio of green herbage vetch detected in different vetch + barley mixture (%) mean

Mixture Ratios	**Vetch Rate in Green Herbage (%)**
100% Vetch	100.00 (90.00 +) A
80% Vetch + 20% Barley	32.73 (34.87) B
60% Vetch + 40% Barley	23.44 (28.95) C
40% Vetch + 60% Barley	14.60 (22.45) D
20% Vetch + 80% Barley	5.19 (13.16) E
Mean	**35.19** **(37.89)**

The means indicated by the same letter are statistically different from each other according to the LSD test within the error range of P≤0.01.
+Angle value

4.5. Dry Hay Yield (kg/da)

In pure sowing barley and vetch mixture of four different dry matter yield as a result of analysis of variance of the values measured in the plots are given in table 4.9.

As seen from the table, the mixing ratio of the hay yield statistically significant at the 1% level is understood that a very significant impact. The mean hay yields that have been identified in various mixtures are given in Table 4.10.

The highest hay yield as shown in Table 4.10. that 720.99 kg/da was obtained from pure barley plots, the lowest hay yield of 221.63 kg/da have been obtained from pure vetch parcel. Hay yield mean of the mixtures in different proportions of pure seed and (464.56 kg/da) are determined

Table 4.9. Vetch + barley mixture in the hay yield of mixing ratio on the impact of the results of analysis of variance

Variance Source	Degree of Freedom	Squares Total	Squares Average	F Value
Repetition	2	187.04	93.52	0.7277
Mixture Ratio	5	383388.44	76677.688	0.0001**
Error	10	2849.02	284.902	
General	17	386424.50		

**Marked F values is important 1% (P≤0.01).

Table 4.10. Vetch + barley mixture hay yield determined in different (kg/da) mean

Mixture Ratios	**Dry Hay Yield (kg/da)**
100% Vetch	221.63 E
100% Barley	720.99 A
80% Vetch + 20% Barley	419.58 D
60% Vetch + 40% Barley	455.53 C
40% Vetch + 60% Barley	477.87 BC
20% Vetch + 80% Barley	491.74 B
Mean	**464.56**

Means shown in the same letter from one another according to the LSD test P≤0.01 error limits are statistically indistinguishable.

Hay yield different values in terms of research on vetch + barley mixtures in different regions of Turkey were obtained. For example; İzmir ecological conditions hay yield is 791.5 kg/da (Avcıoğlu 1979), Syria ecological conditions of 900 kg/da (Osman and Nersoyan, 1983), under Samsun ecological conditions 853.5 kg/da (Büyükburç et al. 1989), Harran ecological conditions 746-784 kg/da (Silbir 1991), ecological conditions in Hatay 801.9 kg/da (Yilmaz et al. 1996) and 497.6 - 869.0 kg/da (Yilmaz et al. 2015), and Cukurova ecological conditions 708-908 kg/da (Yaktubay and Anlarsal 2000) have identified. We have gained from this research values were determined lower than the findings reported by researchers.

On the other hand, we have obtained from research hay yield values Hatipoglu et al. (1987)'s 271-571 kg/da, (Tükel and Yilmaz, 1987)'s 419 kg/da, (Hatipoglu et al. 1990)'s 440.1 kg/da, (Aydin and Tosun 1991)'s 226.7 kg/da, (Acar 1995)'s 461.76 kg/da, (Arslan and Gülcan 1996)'s 552 kg/da, Yakutbay (1997)'s 636- 729 kg/da, (Yilmaz 1997)'s 558 kg/da, (Karaca and Cimrin 2002) of 247-291 kg/da, (Kerimbek and Mulayim 2003) 359-582 kg/da, Bingöl et al. (2007)'s 250-588 kg/da, Nadeem et al. (2010)'s 404-569 kg/da, Arslan(2012)'s 450.5 kg/da and (Uzun and İdikut 2012)'s 708.7 kg/da. It is in line with the values obtained as. Therefore, soil improvement without extra input and with substantially forage yield could be possible in vetch–cereal intercropping.

4.6. Vetch Rate in Dry Hay (%)

Pure vetch and barley mixture of four different vetch hay on the results of analysis of variance to vetch value measured in the plots are given in Table 4.11.

Table 4.11. Vetch + barley mixture in the mixture hay ratio of variance analysis results regarding the impact of the rate of vetch

Variance Source	Degree of Freedom	Squares Total	Squares Average	F Value
Repetition	2	0.085	0.0425	0.6519
Mixture Ratio	4	10819.745	2704.93625	0.0001**
Error	8	0.748	0.0935	
General	14	10820.578		

**Marked F values is important 1% (P≤0.01).

As seen from the table, the mixture rate of the vetch hay statistically significant at the level of 1% is understood that a very significant impact. Vetch hay mean rate determined in different mixtures are given in Table 4.12.

As shown in the table, the highest rate of vetch 100% in green herbage and pure vetch is obtained while the lowest rate of vetch angle value 5.40% in with 20% vetch + 80% barley mixture in green herbage were obtained of the from plots parcels. Pure vetch

and different mixing ratios in the green herbage, the mean of vetch rate is found to be angle value 34.82%.

Turkey's hay in studies related to common vetch + barley mixtures in different regions with different values for the rate of vetch were obtained. For example, the values we obtained about vetch rate hay (Hatipoglu et al. 1987) 42.06%, (Büyükburç et al. 1989) 66.6%, (Hatipoglu et al. 1990) by 43.00%, (Yaktubay 1997) by 32.07%-37.07%, (Karaca and Cimrin, 2002) 43.3 to 52.0% and (Arslan 2012) by 28.3-59.3% ,while lower than the value obtained; (Kerimbek and Mulayim 2003) 22.13-25.85% is consistent with the values obtained.

Table 4.12. Vetch + barley mixture of hay ratio determined in different vetch (%) mean

Mixture Ratios	**Vetch Rate in Dry Hay (%)**
100% Vetch	100.00 (90.00+) A
80% Vetch + 20% Barley	27.97 (31.92) B
60% Vetch + 40% Barley	23.47 (28.98) C
40% Vetch + 60% Barley	17.26 (24.55) D
20% Vetch + 80% Barley	5.40 (13.43) E
Mean	**34.82** **(37.78)**

The means indicated by the same letter are statistically different from each other according to the LSD test within the error range of P≤0.01.
+Angle value

4.7. Relative Yield Total (RYT)

In pure sowing barley and vetch + barley mixture of four different relative yields as a result of analysis of variance of the total value of the parcel measured are given in Table 4.13.

As seen from the table, it is understood that the mixing ratio of the sum of the relative yield statistically has very significant impact. The total mean relative yield determined in different mixtures are given in Table 4.14.

Table 4.13. Vetch + barley mixture ratio of the mixture in relative yield as a result of variance analysis on the impact of the total

Variance Source	Degree of Freedom	Squares Total	Squares Average	F Value
Repetition	2	0.00872114	0.00436057	0.0074
Mixture Ratio	5	0.17225070	0.3445014	0.0001**
Error	10	0.00522504	0.0005225	
General	17	0.18619689		

**Marked F values is important 1% (P≤0.01).

As shown in table 4.14. highest relative yield total pure sowing plots of 1% is obtained, the lowest sum of the relative yield 20% vetch + 80% barley mixture comprising plots (0.73) was obtained. Total yield of pure seed and proportional to the mean of the mixtures in different ratios was determined to be 0.88.

Table 4.14. Determined by the sum of mean relative yield of vetch + barley mixture in different

Mixture Ratios	**Relative Yield Total (RYT)**
100% Vetch	1.00 A
100% Barley	1.00 A
80% Vetch + 20% Barley	0.87 B
60% Vetch + 40% Barley	0.86 BC
40% Vetch + 60% Barley	0.82 C
20% Vetch + 80% Barley	0.73 D
Mean	**0.88**

Means shown in the same letter from one another according to the LSD test P≤0.01 error limits are statistically indistinguishable.

Studies on Turkey's barley vetch mixtures in different regions relative yield was obtained with different values for the total. For example, we have obtained about the relative yield total values (Karadag and Büyükburç, 2003) by 1.32-1.99 values and (Yilmaz et al. 2015) by 0.91-1.38 are obtained; (Lithourgidis et al. 2007) by 0.92-0.98 was determined shown and causative appraise parallelism as voted.

4.8. Crude Protein Ratio (%)

In pure sowing vetch + barley mixture of four different crude protein content values of variance analysis results are given in Table 4.15.

As seen from the table, mixing ratio of 1% crude protein level is understood that have statistically very significant impact. The mean crude protein content is identified in Table 4.16.

Table 4.15. Vetch + barley mixture ratio of the mixture on the impact of the crude protein content analysis of variance results

Variance Source	Degree of Freedom	Squares Total	Squares Average	F Value
Repetition	2	0.41398	0.20699	0.5383
Mixture Ratio	5	361.26957	72.253914	0.0001**
Error	10	3.13902	0.313902	
General	17	364.82257		

**Marked F values is important 1% (P≤0.01).

The highest crude protein content as shown in the table was obtained from pure vetch plot 20.43%, and the lowest crude protein content were obtained from pure barley plots with 6.27%. The mean crude protein content of the mixture and pure cultivation and different rates has been identified as 12.08%.

Different values for the crude protein content of the work done in Turkey on vetch + barley mixtures in different regions were obtained. For example, the total of crude protein content and important value that obtained by (Bakoğlu and Memis, 2002) were 26.3%, (Uzun and İdikut, 2012) were 23.93% while lower than the values obtained (Silber 1991) obtained 13.47-15.93%, (Aydin and Tosun, 1991) obtained 18.05%, (Acar 1995) 15.76%, (Karaca and Cimrin, 2002) obtained 12.6-13.6%,(Kerimbek and Mulayim 2003) obtained 10.33-14.32%, (Bingöl et al. 2007) obtained 12.49 to 12.92%, (Lithourgidis et al. 2007) obtained 8.95% to 9.85% and (Arslan 2012) obtained 15.5-20.5%. Those values were obtained and shown in parallel.

Table 4.16. Crude protein content determined in different Vetch + barley mixture (%) mean

Mixture Ratios	**Crude Protein Ratio (%)**
100% Vetch	20.43 A
100% Barley	6.27 F
80% Vetch + 20% Barley	14.06 B
60% Vetch + 40% Barley	12.19 C
40% Vetch + 60% Barley	10.85 D
20% Vetch + 80% Barley	8.70 E
Mean	**12.08**

Means shown in the same letter from one another according to the LSD test P≤0.01 error limits are statistically indistinguishable.

4.9. Crude Protein Yield (kg/da)

In pure sowing barley and vetch mixture of four different crude protein analysis of variance results of the yield values measured in the plots are given in Table 4.17.

As seen from the table, the mixing ratio of the statistical level of 1% crude protein yield is understood that has a very significant impact. Crude protein yield means determined in different mixtures are shown in Table 4.18.

Table 4.17. Vetch related effect on crude protein efficiency ratio of the mixture of barley mix variance analysis results

Variance Source	Degree of Freedom	Squares Total	Squares Average	F Value
Repetition	2	13.43733	6.718665	0.6889
Mixture Ratio	5	633.39506	126.679012	0.0040**
Error	10	173.66448	17.366448	
General	17	820.49687		

**Marked F values is important 1% (P≤0.01).

The highest yield of crude protein as shown in table 58.98 kg/da and 80% vetch + 20% barley obtained in the parcels, located in the same group as statistically it 60% vetch + 40% barley (55.59 kg/da) and 40% vetch + 60% barley (51.84 kg/da), followed parcels. The lowest crude protein yield 42.76 kg/da and 20% vetch + 80% barley obtained from

parcels. The mean yield of pure seed and crude protein mixtures in different proportions of 49.98 kg /da are determined.

Table 4.18. Crude protein yield determined in different vetch + barley mixture (kg/da) mean

Mixture Ratios	**Crude Protein Yield (kg/da)**
100% Vetch	45.30 BC
100% Barley	45.39 BC
80% Vetch + 20% Barley	58.98 A
60% Vetch + 40% Barley	55.59 A
40% Vetch + 60% Barley	51.84 AB
20% Vetch + 80% Barley	42.76 C
Mean	**49.98**

Means shown in the same letter from one another according to the LSD test P≤0.01 error limits are statistically indistinguishable.

Different values in terms of the yield of crude protein in the research on barley vetch mixtures in different regions of Turkey were obtained. For example; Konya ecological conditions in the crude protein yield 67.75 kg/da (Acar 1995), obtained 52.33 to 77.35 kg/da (Kerimbek and Mulayim, 2003), obtained 52.0 to 77.5 kg/da (Arslan 2012), Cukurova in ecological terms obtained 79.1 to 119.23 kg/da (Yaktubay and Anlarsal 2000) obtained 90.6 to 146.15 kg/da in Hatay ecological conditions (Yilmaz et al. 2015) as they found. We have gained from this research values were determined lower than the findings reported by researchers.

On the other hand, we obtain from crude protein yield values research (Aydin and Tosun, 1991) obtained 37.46 kg/da is higher than the value obtained; (Tükel and Yilmaz 1987)'s 48.3 kg /da in line with the values obtained Van ecological conditions obtained 31.3 to 75.9 kg/da, (Bingöl et al. 2007) not lower.

4.10. Crude Ash Rate (%)

In pure sowing vetch and barley mixture of four different crude ash content values of variance analysis results are given in Table 4.19.

As seen from the table, the mixing ratio of the crude ash is understood that the 1% level statistically very significant impact. The mean rates of ash that have been identified in various mixtures are given in Table 4.20.

Table 4.19. Vetch + barley mixture ratio of the mixture concerned with the impact of the ash rate variance analysis results

Variance Source	Degree of Freedom	Squares Total	Squares Average	F Value
Repetition	2	1.617476	0.808738	0.0513
Mixture Ratio	5	38.451233	7.6902466	0.0001**
Error	10	1.993618	0.1993618	
General	17	42.062328		

**Marked F values is important 1% (P≤0.01).

The high ash rate as shown in table is 11.41% obtained from pure barley plots in the same group as statistically 80% vetch + 20% barley plots (10.92%) was followed. Lowest rate of 6.86% crude ash and 20% vetch + 80% barley were obtained from parcels. Mean crude ash content of the mixtures in different proportions and pure cultivation was determined to be 9.92%.

Table 4.20. Crude ash detected in different vetch + barley mixture (%) mean

Mixture Ratios	**Crude Ash Rate (%)**
100% Vetch	9.86 C
100% Barley	11.41 A
80% Vetch + 20% Barley	10.92 AB
60% Vetch + 40% Barley	10.19 BC
40% Vetch + 60% Barley	10.27 BC
20% Vetch + 80% Barley	6.86 D
Mean	**9.92**

Means shown in the same letter from one another according to the LSD test P≤0.01 error limits are statistically indistinguishable.

Similar values in terms of crude ash in studies related vetch + barley mixture in different regions of Turkey were obtained. For example; Van ecological conditions 7.10-9.07% (Bingöl et al. 2007) as they found. Our values obtained from this study are similar to findings reported by researchers.

4.11. ADF (Acid Detergent Fiber) Rate (%)

In pure sowing barley and vetch mixture of four different measured values of the ADF rate variance analysis results are given in Table 4.21.

Table 4.21. Vetch + barley mixture in the mixing ratio of the variance analysis results regarding the impact of the ADF rate

Variance Source	Degree of Freedom	Squares Total	Squares Average	F Value
Repetition	2	0.317564	0.158782	0.7814
Mixture Ratio	5	27.558065	5.511613	0.0020**
Error	10	6.279218	0.6279218	
General	17	34.154846		

**Marked F values is important 1% (P≤0.01).

As seen from the table, the mixing ratio of the ADF rate is statistically significant at the 1% level is very important to understand the degree of influence. ADF mean rate determined in different mixtures are given in Table 4.22.

Table 4.22. Determined by the ADF in different Vetch + barley mixture ratio (%) mean

Mixture Ratios	**ADF Rate (%)**
100% Vetch	31.11 B
100% Barley	33.89 A
80% Vetch + 20% Barley	31.37 B
60% Vetch + 40% Barley	30.93 B
40% Vetch + 60% Barley	33.58 A
20% Vetch + 80% Barley	33.23 A
Mean	**32.35**

Means shown in the same letter from one another according to the LSD test P≤0.01 error limits are statistically indistinguishable.

The highest ADF ratio as shown in table was obtained from pure barley plots with 33.89%, followed by statistics as in the same group 40% vetch + 60% barley 33.58% and 20% vetch + 80% barley 33.23% followed parcels. The lowest rates were obtained

of the ADF from plots with 60% vetch + 40% barley 30.92%. ADF at a mean rate of the mixtures in different proportions and pure cultivation was determined as 32.35%.

ADF similar values in terms of percentage in the research related common vetch + barley mixture in different regions of Turkey were obtained. For example; Van ecological conditions from 28.04-33.27% (Bingöl et al. 2007), Greece ecological conditions from 30.4-31.9% (Lithourgidis et al. 2007) and ecological conditions in Hatay 28.98-36.18% (Yilmaz et al. 2015) determined. Our values obtained from this study are similar to findings reported by researchers.

4.12. NDF (Neutral Detergent Fiber) Rate (%)

In pure sowing vetch and barley mixture of four different measured values of NDF rate variance analysis results are given in Table 4.23.

Table 4.23. Vetch + barley mixture measured values of NDF rate variance analysis results

Variance Source	Degree of Freedom	Squares Total	Squares Average	F Value
Repetition	2	2.79871	1.399355	0.5826
Mixture Ratio	5	641.37690	128.27538	0.0001**
Error	10	24.53101	2.453101	
General	17	668.70661		

**Marked F values is important 1% (P≤0.01).

Table 4.24. NDF rate determined in different vetch + barley mixture (%) mean

Mixture Ratios	**NDF Rate (%)**
100% Vetch	46.96 C
100% Barley	62.69 A
80% Vetch + 20% Barley	48.56 C
60% Vetch + 40% Barley	53.28 B
40% Vetch + 60% Barley	54.35 B
20% Vetch + 80% Barley	61.79 A
Mean	**54.61**

Means shown in the same letter from one another according to the LSD test P≤0.01 error limits are statistically indistinguishable.

As seen from the table, the mixing ratio of the NDF rate is statistically significant at the 1% level is very important to understand the degree of influence. The mean values NDF determined at different mixture ratios are shown in Table 4.24.

The highest NDF rate as shown in the table 4.24. was obtained from pure barley plots with 62.69%, in the same group that statistically 20% vetch + 80% barley (61.79%) followed parcels. The lowest rate of NDF was obtained from pure vetch parcel with 46.96%. The mean rate of NDF mixtures in different proportions and pure cultivation was determined to be 54.61%.

NDF rate similar values in terms of research related common vetch + barley mixture in different regions of Turkey were obtained. For example; Van ecological conditions 49.47-57.35% (Bingöl et al. 2007), Greece ecological conditions from 41.4% to 42.9% (Lithourgidis et al. 2007) and ecological conditions in Hatay 47.90-58.73% (Yilmaz et al. 2015) they determined. Our values obtained from this study are similar to findings reported by researchers.

5. CONCLUSIONS AND SUGGESTIONS

In this study, common vetch (*Vicia sativa* L.) with barley (*Hordeum vulgare* L.) to determine the effects on forage yield and quality of mixture ratios order has been carried out in Bingöl Geng district ecological conditions, conclusions and recommendations regarding the findings are as follows.

Dicle University Faculty of Agriculture Working as plant material obtained from the Department of Field Crops glory common vetch and GAP International Agricultural Research and Training Centre Directorate of Altaikat obtained from barley is used. Research was established as a randomized complete block design with three replications according to trial. In the study; ordinary stem length in the vetch, barley plant height, green herbage yield, vetch rate in the green herbage, hay yield, vetch rate in dry herbage, relative yield total was examined features, such as the crude protein content and crude protein yield.

The results obtained from this study are itemized below.

1. Mixing ratio of vetch stem length to be statistically significant at the 5% level 61.33 cm stem length of the high-vetch and 20% vetch + 80% barley mixtures of, with the lowest common vetch 50.40 cm stem length and 80% vetch + 20% barley mixture comprising functioning as obtained from the plot. Mixtures in different proportions of ordinary pure vetch and vetch mean stem length were determined to be 55.45 cm.

2. Barley plants that not affect the length of the mixing ratio statistically significant 5% level, the mixing ratio of vetch + barley, barley plant height was determined to range from 68.30 cm to 78.00 cm. Pure barley and barley-long mean of the mixture was found to be 71.01cm in different proportion.

3. Mixing ratio of herbage yield statistically that affects a significant level of 1%, highest green herbage yield with 1316.44 kg/da was obtained from pure barley plots, the lowest green herbage yield with 683.78 kg/da and 80% vetch + 20% barley mixture comprising functioning as obtained from the plot. Pure green herbage cultivation and mean yield of 824.41 kg/da of mixture in different ratios as have been identified.

4. Mixing ratio of green herbage in the vetch ratio is statistically 1% level very significant impact, the highest vetch ratio green herbage is angle value 100% and obtained from the parcels the lowest ratio of vetch in green herbage of pure vetch angle value 5.19%, and 20% vetch + 80% barley mixture comprising functioning as obtained from the plot. Pure vetch and vetch mean rate on green herbage mixtures in different ratios were found to be 35.19%.

5. Mixing ratio of hay yield statistically that affects a significant level of 1%, the highest dry matter yield 720.99 kg/da is obtained from pure barley parcel, and the lowest hay yield of 221.63 kg/da obtained from pure vetch parcel. It was found to be hay yield and mean of the mixtures in different proportions of pure seed 464.56 kg/da are determined.

6. The mixing ratio of dry herbage in the vetch ratio is statistically 1% level very significantly affect the highest vetch rate in hay is angle value 100% and were obtained from the parcels of pure vetch, the lowest rate of vetch in dry herbage is angle value 5.40% and 20% vetch + 80% barley mixture containing is determined that obtained from the plot. Pure vetch and vetch hay mean rate of 34.82% has been identified as a mixture in different ratios.

7. The mixing ratio of the sum of the relative yield at 1% level statistically very significant impact, the highest relative yield of the plots where the total pure plantation (1.00) is obtained, the lowest sum of the relative yield 20% vetch + 80% barley mixture containing (0.73) had obtained. Total yield of pure seed and proportional to the mean of the mixtures in different ratios was determined to be 0.88.

8. The mixing ratio of the crude protein content of the statistically affected in a very significant level of 1%, the highest crude protein content, was obtained from pure vetch plot 20.43%, and the lowest crude protein content was found to be 6.27% obtained from the pure barley plots. The mean crude protein content of the mixture in pure cultivation and different rates 12.08% has been identified as.

9. The mixing ratio of the crude protein yield was statistically very significant impact on the level of 1%, the highest crude protein yield 58.98 kg/da and 80% vetch + 20% barley obtained from plots, whereas the minimum crude protein yield 42.76 kg/da and 20% vetch + 80% barley. It was found to be obtained from barley plots. The mean yield of pure seed and crude protein mixtures in different proportions of 49.98 kg/da are determined.

10. The mixing ratio of ash rate was statistically affects a significant level of 1%, the highest ash ratio 11.41%, is obtained from pure barley plots, while the minimum crude ash with 6.86% and 20% vetch + 80% barley to be obtained from plots. Mean crude ash content of the mixtures in different proportions and pure cultivation was determined to be 9.92%.

11. The mixing ratio of the ADF rate was statistically affects a significant level of 1%, while derived from pure barley plots with the highest ADF ratio of 33.89%, while the lowest ADF ratio of 30.92% and 60% vetch + 40% barley was determined that derived from plots. ADF at a mean rate of the mixtures in different proportions and pure cultivation was determined as 32.35%.

12. The mixing ratio of the NDF rate was statistically affects a significant level of 1%, the highest NDF rate is obtained from pure barley plots with 62.69%, while the lowest NDF rate 46.96%, it was found that obtained from pure vetch parcel. NDF ratio on pure seed and mixtures of different ratio is determined as 54.61%.

Bingol province as a recommendation should be made a few more years of experiments in question. One year research results; the highest crude protein and lowest ADF content in terms of the optimum mixture ratio 60% vetch + 40% barley mixture can be showed that.

REFERENCES

Acar, R., "Sulu Şartlarda İkinci Ürün Olarak Bazı Baklagil Yem Bitkileri ve Tahıl Karışımlarının Yetiştirme İmkanları", Selçuk Üniversitesi Fen Bilimleri Enstitüsü, Yüksek Lisans Tezi, Konya, l995.

Acar, Z., Önal Aşçı, Ö., Ayan, İ., Mut, H., Başaran, U., "Yem Bitkilerinde Karışık Ekim Sistemleri", Ondokuz Mayıs Üniversitesi Ziraat Fakültesi Ziraat Dergisi, 21(3): 379-386, 2006.

Anlarsal, AE., "Çukurova Koşullarında Bazı Adi Fiğ (*Vicia sativa* L.) Çeşitlerinde Bitkisel ve Tarımsal Özellikler ve Bunlar Arası İlişkiler Üzerinde Araştırmalar", ÇÜ. Fen Bilimleri Enstitüsü Tarla Bitkileri Anabilim Dalı, Doktora Tezi, Adana, 1987.

Anonymous. The climatic data of Bingol province. The General Director of State Meteorological Service, Bingol, Turkey, 2016.

Arslan, A. ve Gülcan, H., "Güneydoğu Anadolu Bölgesinde Kışlık Ara Ürün Olarak Yetiştirilen Değişik Fiğ ve Arpa Karışımlarında Biçim Zamanının Ot Verimi ve Bazı Tarımsal Özelliklere Etkisi", Türkiye 3. Çayır-Mera ve Yembitkileri Kongresi (l7-l9 Haziran l996), 34l-347, Erzurum, 1996.

Avcıoğlu, Ş., "Çeşitli Fiğ + Arpa ve Yulaf Hasıllarının Verim ve Diğer Bazı Özellikleri Üzerinde Araştırmalar", Ege Bölge Zirai Araştırma Enstitüsü, Doktora Tezi, İzmir, 1979.

Aydın, İ., Tosun, F., "Samsun Ekolojik Koşullarında Yetiştirilen Adi Fiğ + Bazı Tahıl Türlerinde Farklı Karışım Oranlarının Kuru Ot Verimine, Ham Protein Oranına ve Ham Protein Verimine Etkileri Üzerine Bir Araştırma", Türkiye 2. Çayır Mer'a ve Yembitkileri Kongresi, 28–31 Mayıs 1991, s. 332–34, İzmir, 1991.

Aydýn, I., and F. Tosun. A research on the effect of different mixture ratios for Common Vetch + some Cereal species grown under Samsun ecological conditions on hay yield, crude protein proportion and yield Turkish 3rd. Field Crops Congress 322-340, 1991.

Akman, H. A. Tamkoc and A. Topal, Effects on yield, yellow berry and black point disease of fertilization applications in Hungarian vetch and durum wheat intercropping system. Digital Proceeding of the ICOEST'2013, Cappadocia, June, 18-21, Nevsehir, Turkey.839-847, 2013.

Arslan, S., "Effect of different vetch (Vicia sativa L.) barley (Hordeum vulgare L.) mixtures on yield and quality ", Selcuk University Institute of Science and Technology, Department of Field Crops, Graduate Thesis, 46 pages, Konya, 2012.

Albayrak, S., M. Guler and MO. Tongel. Effects of seed rates on forage production and hay quality of vetch-triticale mixtures. Asian J. of Plant Sciences, 3(6): 752-756, 2004.

Bakoğlu, A. ve Memiş, A., "Farklı Oranlarda Ekilen Adi Fiğ (*Vicia sativa* L.) ve Arpa (*Hordeum vulgare* L.) Karışımlarında Tohum Verimi ve Bazı Özelliklerin Belirlenmesi", F. Ü. Fen ve Mühendislik Bilimleri Dergisi, 14(1): 29-35, 2002.

Basbag, M., I. Gul and V. Saruhan. .The effect of different mixture ratios in some annual legume and cereal mixtures on yield and its components under Diyarbakır conditions. Turkish 3rd. Field Crops Congress (Fodder plant and edible grain legumes) 69-74; 15-20 November 1999. Adana, 1999

Bingöl, NT., Karslı, MA., Yılmaz, İH., Bolat, D., "The effects of planting time and combination on the nutrient composition and digestible dry matter yield of four mixtures of vetch varieties intercropped with barley", Turkish Journal of Veterinary and Animal Sciences, 31(5): 297-302, 2007.

Buğdaycıgil, M., Sabancı, CD., Özpınar, H. ve Eğinlioğlu, G., "Değişik Fiğ + Arpa Karışım Oranlarının Ot Verimine ve Kalitesine Etkisi", Türkiye 3. Çayır-Mer'a Yembitkileri Kongresi (l7-l9 Haziran l996), 3l6-320, Erzurum, 1996.

Büyükburç, U., Munzur, M. ve Akman, R., "Tek Yıllık Baklagil Yem Bitkileri + Tahıl Karışımlarının Samsun İli Ekim Nöbeti İçindeki Yeri Üzerinde Araştırmalar", Tarla Bitkileri Merkez Araştırma Enstitüsü, Yayın No:7, Ankara, l989.

Bedir, S., Research on determination of proper seed mixture ratio of Hungarian vetch and barley to be grown under conditions of Karaman. MsC Thesis, Cukurova University, Adana, 2010

Balabanli, C. and M. Turk., The effects of harvesting periods in some forage crops mixture on herbage yield and quality. J. of Bio. Sci. 6(2):265-268, 2006.

De Wit, CT. and Van Den Bergh, JP., "Competition between Herbage Plants", Netherlands Journal of Agricultural Science, 13: 212-221, 1965.

Dhima, KV., Lithourgidis, A.S., Vasilakoglou, I.B. and Dordas, CA., Competition indices of common vetch and cereal intercrops in two seeding ratio. Field Crops Research. 100: 249-256. URL: www.elsevier.com/locate/fcr. 2007.

Gunduz, ET., Effects of mixture ratio on hay yield and hay quality of Hungarian vetch+ wheat mixture under Diyarbakir conditions. MsC Thesis, Cukurova University, Adana, Turkey. (In Turkish with English abstracts) 2010.

Hatipoğlu, R., Anlarsal, AE., Tükel, T., Baytekin, H., "Çukurova Bölgesi Kıraç Koşullarında Yetiştirilen Fiğ + Arpa Karışımında Biçim Zamanlarının Ot Verimi ve

Botanik Kompozisyona Etkisi Üzerinde Araştırmalar", ÇÜ. ZF. Dergisi, (1990), 5(3): 178-182, 1987.

Hatipoğlu, R., Anlarsal, AE., Tükel, T. ve Baytekin, H., "Çukurova Bölgesi Kıraç Koşullarında Yetiştirilebilen Fiğ Arpa Karışımında Biçim Zamanlarının Ot Verimi ve Botanik Kompozisyonuna Etkisi Üzerinde Bir Araştırma", Çukurova Üniversitesi Ziraat Fakültesi Dergisi, 5(3): 174-182, Adana, 1990.

Hauggard-Nielsen, H., Gooding, M., Ambus, P., Corre-Hellou, G., Crozat, Y., Dahlmann, C., Dibet, A., Von Fragstein, P., Pristeri, A., Monti M. and Jensen, E.S., Pea–barley intercropping for efficient symbiotic N2-fixation, soil N acquisition and use of other nutrients in European organic cropping systems. Field Crops Res. 113:64-71, 2009.

Kaçar, B., "Bitki Besleme Uygulama Kılavuzu", Ankara Üniversitesi Ziraat Fakültesi Yayınları No: 647, Uygulama Kılavuzları No: 206, 1977.

Karaca, S., Çimrin, KM., "Adi fiğ (*Vicia sativa* L.) + Arpa (*Hordeum vulgare* L.) karışımında azot ve fosforlu gübrelemenin verim ve kaliteye etkileri", Yüzüncü Yıl Üniversitesi Ziraat Fakültesi Tarım Bilimleri Dergisi, 12(1): 47-52, 2002.

Karadağ, Y., Büyükburç, U., "Effects of seed rates on forage production, seed yield and hay quality of annual legume-barley mixtures", Turkish Journal of Agriculture and Forestry, 27: 169-174, 2003.

Kerimbek, C. ve Mülayim, M., "Bazı Baklagil Yembitkileri ve Tahıl Karışımlarının Ot İçin İkinci Ürün Olarak Yetiştirilmesi", Türkiye 5. Tarla Bitkileri Kongresi, II. Cilt, 79-83, Diyarbakır, 2003.

Kutlu R. H., The techniques of feed evaluation and analysis (lecture note) Cukurova University Agr. Fac. Animal Husbandary Department pp. 10, Adana, 2008.

Karagic D, Vasiljević, S, Katić S, Mikić A, Milić D, Milošević B, Dušanić N., Yield and quality of winter common vetch (*Vicia sativa* L.) haylage depending on sowing method. Biotechnol Anim Husbandry 27: 1585–1594, 2011.

Lithourgidis, AS., Dhima, KV., Vasilakoglou, I.B., Dordas, CA., Yiakoulaki, MD., "Sustainable production of barley and wheat by intercropping common vetch", Agronomy Sustainable Development, 27: 95-99, 2007.

Lithourgidis AS, Dordas CA, Damalas CA, Vlachostergios DN. Annual intercrops: an alternative pathway for sustainable agriculture. Aus J Crop Sci 5: 396–410, 2011.

Lithourgidis AS, Vasilakoglou IB, Dhima KV, Dordas CA, Yiakoulaki MD. Forage yield and quality of common vetch mixtures with oat and triticale in two seeding ratios. Field Crop Res 99: 106–113, 2006.

Lauk, R. and Lauk, N. Dual intercropping of common vetch and wheat or oats, effects on yields and interspecific competition. Agron. Res. 7: 21–32, 2009.

Mariotti, M., Masoni, A., Ercoli, L. and Arduini, I., Above-and below-ground competition between barley, wheat, lupin and vetch in cereal and legume intercropping system. Grass Forage Sci. 64: 401-412, 2009.

Mariotte, P., A. Buttler, D. Johnson, A. Thebault and C. Vandenberghe" Exclusion of root competition increases competitive abilities of subordinate plant species through root-shoot intecactions. J. Veget. Sci. 23: 1148-1158, 2012.

Nadeem, M., Ansar, M., Anwar, A., Hussain, A., Karaca, S., "Performance of winter cereal-legumes fodder mixtures and their pure stand at different growth stages under rainfed conditions of Pothowar", Journal of Agricultural Research, 48(2): 181-192, 2010.

Osman, AE., Nersoyan, N., "Prospects of Using Forage Mixtures for Grazing by Sheep in winter and for Hay Making Afterwards", ICARDA Management of Grazing Systems, 245-246, Syria, 1983.

Ozel, A., Determining the appropriate mixture rations in barley + Hungarian vetch and barley + common vetch mixtures. MsC, Mustafa Kemal University, Hatay, Turkey (in Turkish with English abstract), 2010.

Orak, A. and V. Uygun., Some important morphological characters and green fodder yield of berseem clover (*Trifolium alexandrinum* L.) and Italian ryegrass (*Lolium multiflorum Lam.*) mixtures which have different sowing norms row spacing and mixture rates. 3. Pasture and Forage Crops Meeting of Turkey. 17-19 June, 369-375. (in Turkish with English abstract), 1996.

Pinar, I., The effect of different rates of mixture on the yield and some yield characteristics of hairy vetch (*Vicia villosa Roth.*) + barley (*Hordeum vulgare* L.) and hungarian vetch (*Vicia pannonica Crantz.*) + barley *(Hordeum vulgare* L.) mixtures. MsC, Ege University. Izmir, Turkey (in Turkish with English abstract), 2007.

Sağlamtimur, T., Tükel, T., Gülcan, H., Anlarsal, AE., Tansı, V., Baytekin, H., Şılbır, Y., "GAP Bölgesinde Yembitkileri Yetiştirme Olanakları", Türkiye 2. Çayır-Mer'a ve Yembitkileri Kongresi, 28-31 Mayıs 1991, E.Ü. Basımevi, 213-224, İzmir, 1991.

Soya, H., Tosun, M., Ergin, IZ., Çelen, AE., "Kimi Fiğ Türleri (*Vicia* sp.)'nin Arpa (*Hordeum vulgare* L.) ile Karışımlarında Ot Verimi ve Verim Özellikleri Üzerinde Araştırmalar", E. Ü. Ziraat Fak. Derg. Yay. No.28 (1): 105-122, İzmir, 1991.

Şılbır, Y., Tansı, V., Sağlamtimur, T., "GAP Bölgesinde Kışlık Ara Ürün Tarımı ve Bölge için Önemi", Türkiye 2. Çayır-Mer'a ve Yembitkileri Kongresi, 28-31 Mayıs 1991, EÜ. Basımevi, 235-236, İzmir, 1991.

Tan, M. ve Serin, Y., "Fiğ+Tahıl Karışımlarında Karışım Oranları ve Biçim Zamanlarının Makro Besin Elementi Kompozisyonuna Etkileri", Türkiye 3. Çayır-Mer'a ve Yembitkileri Kongresi (l7-l9 Haziran l996), 308-3l5, Erzurum, 1996.

TÜİK, "Tarım İstatistikleri", http:// www.tuik.gov.tr (Erişim tarihi: 3 Aralık 2009), 2009.

Tükel, T. ve Hatipoğlu, R., "Çayır-Mera Amenajmanı", ÇÜ. Ziraat Fakültesi Genel Yayın No: 191, Ders Kitapları Yayın No: A-59, 1997.

Tuna, C. and A. Orak., The role of intercropping on yield potential of common vetch (Vicia sativa L.)/oat (Avena sativa L.) cultivated in pure stand and mixtures. Journal of Agricultural and Biological Science. 2(2): 14-19, 2007.

Tükel, T., Yılmaz, E., "Çukurova Kıraç Koşullarında Yetiştirilebilecek Fiğ (*Vicia sativa* L.) + Arpa *(Hordeum vulgare* L.) Karışımında En Uygun Karışım Oranının Saptanması Üzerinde Bir Araştırma", Doğa Tarım ve Ormancılık Dergisi, 115: 171-178, 1987.

Uzun, B. ve İdikut, L., "Arpa, Fiğ ve Karışım Ekimine Uygulanan Bakterinin (*Rhizobium leguminosarum* L.) Biyolojik Verim ve Kalite Değerlerine Etkisinin Araştırılması", Tarım Bilimleri Araştırma Dergisi, 5(2): 156-160, 2012.

Van Soest, PJ., The use of detergents in the analysis of fibre feeds. II. A rapid method for the determination of fibre and lignin. J. of the Assoc. of Official Analytical Chemists. 46: 829-835, 1963.

Van Soest, PJ. et al. The use of detergents in the analysis of fibrous feeds. IV. Determination of plant cell wall constituents. J. of the Assoc. of Official Anal. Chemists. 50: 50-55, 1967.

Yağbasanlar, T., "Çukurova'nın Taban ve Kıraç Koşullarında Farklı Ekim Tarihlerinde Yetiştirilen Değişik Kökenli Yedi Tritikale Çeşidinin Başlıca Tarımsal ve Kalite Özellikleri Üzerinde Araştırmalar", Ç.Ü. Fen Bilimleri Enstitüsü Tarla Bitkileri Anabilim Dalı, Doktora Tezi, Adana, 1987.

Yakutbay, Ş., "Çukurova koşullarında farklı ekim ve biçim zamanlarının bazı adi fiğ (*Vicia sativa* L.) ve tüylü fiğ (*V. villoso* Roth) çeşitlerinin arpa (*Hordeum vulgare* L.) ile karışımlarında verim ve verimle ilgili özelliklere etkisi üzerinde bir araştırma", Doktora Tezi, Çukurova Üniversitesi, Adana, 1997.

Yatkubay, Ş., Anlarsal, AE., "Çukurova Koşullarında Farklı Ekim ve Biçim Zamanlarının Bazı Adi Fiğ (*V. sativa* L.) ve Tüylü Fiğ (*V. villosa* Roth.) Çeşitlerinin Arpa (*Hordeum vulgare* L.) İle Karışımlarında Verim ve Evrimle İlgili Özelliklere Etkisi Üzerinde Bir Araştırma", Çukurova Üniversitesi Fen Bilimleri Enstitüsü, s. 107, Adana, 2000.

Yılmaz, Ş., Günel, E. ve Sağlamtimur, T., "Hatay Ekolojik Koşullarında Yetiştirilebilecek Adi Fiğ (*Vicia sativa* L.) + Arpa (*Hordeum vulgare* L.) Karışımında En Uygun Karışım Oranının ve Biçim Zamanının Belirlenmesi Üzerinde Bir Araştırma", Türkiye 3. Çayır-Mer'a Yembitkileri Kongresi (l7-l9 Haziran l996), 355-361, Erzurum, l996.

Yılmaz, Ş., "Amik Ovası Koşullarında Kışlık Ara Ürün Olarak Adi Fiğin (*Vicia sativa* L.) Arpa (*Hordeum vulgare* L.), Yulaf (*Avena sativa* L.) ve Tritikale (*Triticosecale* Wittmark) ile Karışım Olarak Yetiştirilme Olanakları Üzerine Bir Araştırma", ÇÜ. Fen Bilimleri Enstitüsü, Doktora Tezi, 114, 1997.

Yılmaz, Ş., Özel, A., Atak, M., Eryaman, M., "Effects of seeding rates on competition indices of barley and vetch intercropping systems in the Eastern Mediterranean", Turkish Journal of Agriculture and Forestry, 39: 135-143, 2015.

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