# Performances of the first registered forage cowpea cultivar of Turkey: Ülkem

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# Performances of the first registered forage cowpea cultivar of Turkey: Ülkem

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**Abstract.** Milk production has increased and become intensive in some parts of Turkey. In parallel to the increasing milk production, farmers demand high yielding annual legume forage crops for summer seasons in irrigated lands to grow as mixture with maize and sorghum. Regarding this point, cowpea has been conducted in researches more than 15 years. This study was conducted to determine the effects of row spacing and sowing dates of the Cultivar 'ÜLKEM' and a promising forage cowpea genotype on seed yield and some other characters i such as the number of seeds per pod, pod length, thousand seed weight and seed yield. In this study, It was clear that the Cultivar ÜLKEM was superior to the promising genotype; higher yields were obtained in sowing date 1st May; larger row spacing caused decreasing seed yields however larger row spacing had positive effect on other measured characters. The highest seed yields were determined at 30 cm row spacing (121.18 and 141.14 kg/da) for both sowing times. Average thousand seed weights were determined between 157.14 and 187.50 g at 1st May and 155.85 and 178.59 g at 1st June. In conclusion, for high seed yield, cowpea could be sown in 30 cm row spacing at the earliest possible time in spring.

**Keywords.** Sowing date – Row spacing – Seed yield – Forage cowpea.

***Performances du premier cultivar de dolique fourrager enregistré en Turquie : Ülkem***

***Résumé.*** *La production de lait a augmenté et est devenue intensive dans certaines zones de Turquie. En parallèle à cette production laitière accrue, les éleveurs réclament des cultures de légumineuses fourragères annuelles à fort rendement pour la saison estivale en terres irriguées, à cultiver en mélange avec du maïs et du sorgho. Sur ce point, des recherches ont été menées sur le dolique pendant plus de 15 ans. Cette étude a pour but de déterminer les effets de l'espacement des rangs et des dates de semis du cultivar 'ÜLKEM' et d'un génotype prometteur de dolique fourrager sur le rendement en graines et d'autres caractères tels que le nombre de graines par gousse, la longueur des gousses, le poids de mille graines et le rendement en graines. Il ressort de cette étude que le cultivar ÜLKEM est supérieur au génotype prometteur; des rendements plus élevés sont obtenus avec la date de semis du 1er mai; un espacement plus large des rangs entraîna de plus faibles rendements en graines tandis qu'il avait un effet positif sur les autres caractères mesurés. En conclusion, pour un rendement élevé en graines, le dolique pourrait être semé en rangs espacés de 30 cm et le plus tôt possible au printemps.*

***Mots-clés.*** *Date de semis – Espacement des rangs – Rendement en grains – Dolique fourrager.*

## I – Introduction

Cowpea (*Vigna unguiculata* L. Walp) is a substantial food and a valuable part of the conventional cropping systems in the drier region tropics of Asia, Africa and Central America (Mortimore *et al*., 1997). This precious tropical and subtropical legume is especially important for the semi-arid regions of the tropics for forage, green pods and grains (Adeyanju *et al*., 2007; Ali *et al*., 2004). Cowpea is one of the super plants among legumes regarding resistance to high temperature and drought. Considering the temperature rise and reduction of water resources due to global climate change, it is emerging as a plant to be worked on.

Cowpea is often used as human and animal nutrition and green manure. Green hay, silage and cowpea seeds are used for animal nutrition. Having a high nutritive value of green forage cowpea, green hay contains 14-21% crude protein, while the seeds have the rate of 18-26% crude protein. Seed yield of forage cowpea ranges between 500 and 3500 kg/ha. It is stated

that cowpea is grown alone for green hay yield. However, it could be grown mixed with maize, sorghum and millets for silage (Ismail and Hall, 2000; Saricicek *et al.*, 2002; Bilgili, 2009; Basaran *et al.*, 2011; Ayan *et al.*, 2012).

## II – Materials and methods

The study was carried out in 2013 and 2014 for two years and was designed as split split plots with 4 replications in Amasya-Suluova ecological conditions. The experiment was designed as sowing dates at main plots, inter row distances at split plots and cultivars at split-split plots. Throughout the vegetation period (from May to September) of 2013 and 2014 total rainfall were 103.1 mm and 168.6 mm, mean temperature were 19.5ºC and 20.2ºC, average relative humidity were 62.0 % and 67.3 %, respectively. While mean temperature was similar both years, total rainfall and average relative humidity were lower in 2013 than 2014. Released forage cowpea cultivar "ÜLKEM" and a promising cowpea genotype were examined to figure out the effects of different row spacing (30, 45, 60 and 75 cm) and two sowing dates (1$^{st}$ May and 1$^{st}$ June) on number of seed per pod, pod length, thousand seed weight and seed yield. The study was completed in irrigated conditions (three times in 2013, and six times in 2014). Irrigation process was continued until soil humidity comes to field capacity. All data obtained from this study was analysed by using SPSS 17.0 program. The differences amongst the mean values were calculated according to DUNCAN test.

## III – Results and discussion

Released forage cowpea cultivar "ÜLKEM" was superior to the promising forage cowpea genotype for all examined characters considering both sowing dates and all row spacing treatments. In both years, higher values were obtained in terms of all the studied characters on sowing date of 1st May. Regardless of sowing time, as row spacing expands, pod length, the number of seeds per pod and 1000-seed weight values increased yet seed yield decreased in both the Cultivar ÜLKEM and the Genotype.

Sowing date affected average pod length (between 12.6 and 10.95 cm) in 2013. In addition to this, average number of seed per pod (10.17 and 8.94 number) and thousand seed weight (169.17 and 168.17 g) were similarly affected by sowing date (Table 1). Average seed yield of both genotypes and cultivar Ülkem were affected by row spacing. The highest seed yields were determined at 30 cm row spacing (121.18 and 141.14 kg/da) for both sowing times (Fig. 1).

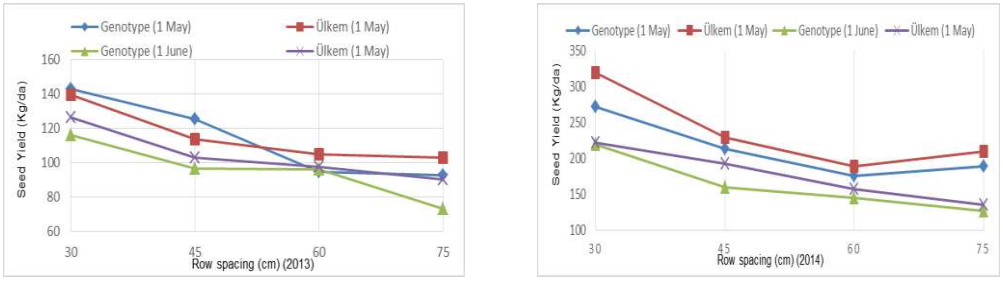


**Fig. 1. Seed yields of Cultivar Ülkem and Genotype grown in different row spacings in 2013 – 2014 (sowing dates of 1$^{st}$ May and 1$^{st}$ June).**

**Table 1. Seed yields and value of some agronomic characters of forage cowpea grown in different row spacings (2013- 2014)***

| Row space | 2013 | | | | | | 2014 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sowing date: 1 May | | | Sowing date: 1June | | | Sowing date: 1 May | | | Sowing date: 1 June | | |
| | Genotype | Ulkem | Average | Genotype | Ulkem | Average | Genotype | Ulkem | Average | Genotype | Ulkem | Average |
| | Pod lenght (cm) | | | | | | | | | | | |
| **30 cm** | 8.27 | 10.2 | **9.23 c** | 6.6 | 8.03 | **7.32 d** | 13.43 | 13.3 | **13.37 d** | 11.07 | 10.3 | **10.68 b** |
| **45 cm** | 11.7 | 11.87 | **11.78 b** | 9.2 | 9.67 | **9.41 c** | 15.47 | 14.07 | **14.77 c** | 13.27 | 11.7 | **12.48 ab** |
| **60 cm** | 13.13 | 13.83 | **13.48 a** | 12.93 | 12.57 | **12.75 b** | 17.57 | 15.9 | **16.73 b** | 14.2 | 12.93 | **13.57 a** |
| **75 cm** | 12.87 | 15.4 | **14.13 a** | 13.17 | 15.4 | **14.28 a** | 18.17 | 18.6 | **18.38 a** | 14.77 | 14.57 | **14.67 a** |
| **Average** | 11.49 | 12.83 | **12.16 A** | **10.48** | **11.42** | **10.95 B** | 16.16 | 15.47 | **15.81 A** | **13.33** | **12.38** | **12.85 B** |
| | Number of seed per pod (adet) | | | | | | | | | | | |
| **30 cm** | 7.38 | 9.2 | **8.29 c** | 5.03 | 6.17 | **5.60 d** | 9.12 | 11.9 | **10.51 c** | 9.2 | 8.83 | **9.01 c** |
| **45 cm** | 9.18 | 10.69 | **9.94 b** | 7.73 | 8.86 | **8.30 c** | 10.46 | 11.02 | **10.74 c** | 10.31 | 10.74 | **10.52 b** |
| **60 cm** | 9.01 | 10.91 | **9.96 b** | 8.69 | 10.29 | **9.49 b** | 11.63 | 12.14 | **11.88 b** | 10.8 | 12.27 | **11.53 a** |
| **75 cm** | 10.86 | 14.12 | **12.49 a** | 11.81 | 12.89 | **12.35 a** | 13.74 | 14.62 | **14.18 a** | 11.69 | 13.11 | **12.40 a** |
| **Average** | **9.11** | **11.23** | **10.17 A** | **8.31** | **9.55** | **8.94 B** | **11.23** | **12.42** | **11.83 A** | **10.50** | **11.23** | **10.87 B** |
| | Thousand seed weight (g) | | | | | | | | | | | |
| **30 cm** | 156.86 | 157.41 | **157.14 c** | 161.69 | 150.01 | **155.85 c** | 176.93 | 189.7 | **183.31 d** | 176.51 | 175.63 | **176.07 c** |
| **45 cm** | 158.67 | 167.49 | **163.08 b** | 173.98 | 167.66 | **170.82 ab** | 185.26 | 195.03 | **190.14 c** | 183.94 | 181.27 | **182.61 c** |
| **60 cm** | 165.18 | 172.73 | **168.96 b** | 168.67 | 169.86 | **169.26 b** | 200.67 | 202.34 | **201.50 b** | 191.84 | 190.61 | **191.22 b** |
| **75 cm** | 182.69 | 192.31 | **187.50 a** | 182.9 | 174.28 | **178.59 a** | 209.16 | 230.31 | **219.74 a** | 209.61 | 202.78 | **206.19 a** |
| **Average** | **165.85** | **172.48** | **169.17 A** | **171.81** | **165.45** | **168.63 B** | **193.01** | **204.34** | **198.67 A** | **190.47** | **187.57** | **189.02 B** |

*There are no differences amongst the means indicated same letter at the same line and same column at P≤0.05 probability level.

Row spacing affected the average pod length at both sowing dates in 2014. It was ranged between 9.23-14.13 and 7.32-14.28 cm respectively, for the first and second sowing dates. Number of seed per pod ranged between 8.29 and 12.49 at 1st May, and between 5.60 and 12.35 at 1st June. Average thousand seed weights were determined between 157.14 and 187.50 g at 1st May and 155.85 and 178.59 g at 1st June (Table 1). In parallel with the increase of number of irrigation in 2014, an increase could be seen in all characters except number of seed per pod. It was observed that irrigation during dry periods remarkably increased the yield and yield components although forage cowpea is resistant to drought (Table 1 and Fig. 1).

## IV – Conclusions

In future farming system, the importance of cowpea, known as resistant to high temperature and drought, is likely to increase due to changing climatic conditions. In this study, 30 cm distance has emerged as the most suitable the row spacing for seed production. Taking into account the increasing temperature and drought period, the earliest sowing date as possible should be preferred in order to achieve high efficiency.

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