Trade – off in forge yield and quality of Eygption Clover as affected by mowing time.

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Abstract:

Literally , legumes forage are any plant consumed by live stock and help in renewal of organic matter, improve soil tilth and restores soil fertility. Egyptian Clover seeded at 15th and 17th November during 2016-17 and 2017-18, at seeding rate 40kg $ha^{-1}$by broad casting and mowed after 30,60,90 and 120 days after seeding (DAS) to evaluate the time of mowing effects on growth traits (crop growth rate , richness index; plant height; leaves per plant; leaves area index , specific leaves area , fresh and dry forge yield) and quality trait (Forge protein content%).

Tow field experiments layout by RCBD with un effect statistically crop growth rate , richness index and plants per m^2 in both tow seasons, meanwhile significant affect ($p<0.01$) of plant height, specific leaves area; plant leaves area; forge yield |(fresh 60.98 and 58.35 kg m^{-2} and dry 24.39 , 23.34kg m^{-2} in both seasons receptivity from mowing 120 DAS comparing to the other times , further significant increase($p<0.01$) of forge protein content 12.37 and 13.59% from early mowing 30 DAS comparing to 9.72 and 10.04% at 120DAS in both tow seasons respectively. In conclusion mowing 120DAS gave the greatest yield meanwhile after 30 DAS gave the best quality.

Key words: *Egyptian Clover – mowing time.*

تأثير موعد حش البرسيم المصري علي المحصول الطازج والجاف وجودته

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الملخص:

ببساطة محاصيل العلف البقولية هي الأنواع المستهلكة لعلف الحيوان والمساعدة في تجديد المادة العضوية بالتربة وتحسين ظروف الحرث وإعادة تجديد خصوبة التربة. تمت زراعة البرسيم المصري في 15 و 17 نوفمبر لموسمي الزراعة 2016 – 2017 و 2017 – 2018 بالترتيب بمعدل 40 كجم / هـ بالزراعة النثرية والحش بعد 30، 60، 90، 120 يوم من الزراعة (DAS) لتقييم تأثير زراعة موعد الحش علي خصائص النمو(معدل نمو المحصول، دليل الوفرة، عدد النباتات / م^2، ارتفاع النبات، عدد الأوراق بالنبات، المساحة النوعية للأوراق، وخصائص الإنتاج (المحصول الطازج والجاف كجم / م^2) ومحتوي المحصول من البروتين %.

صممت التجارب بالقطاعات كاملة العشوائية RCBD في 4 مكررات. أظهرت النتائج عدم التأثر إحصائيا معدل نمو المحصول، دليل الوفرة، عدد النباتات م^2 في كلا موسمي الدراسة، بينما تأثر بمعنوية عالية ارتفاع النبات، المساحة النوعية للأوراق، مساحة الأوراق بالنبات، محصول العلف الطازج والجاف 60.98 ، 58.35 كجم / م^2 و24.39، 23.34 كجم / م^2 لكليهما بالترتيب نتيجة الحش بعد 120 يوم من الزراعة مقارنة مع بقية مواعيد الحش لكلا موسمي الدراسة بالترتيب، علاوة علي أن محتوى العلف من البروتين تأثر بمعنوية عالية بموعد الحش، الأعلى 12.37، 13.58% عند الحش بعد 30 يوم من الزراعة مقارنة بالأقل 9.72، 10.04% نتيجة الحش بعد 120 يوم من الزراعة. يستخلص من هذه الدراسة بأن الحش بعد 120 يوم من الزراعة أعطى أعلى محصول

علف طازج وأخضر بينما الحش بعد 30 يوم من الزراعة أعطت أعلى محتوى بروتين بالعلف.

كلمات مفتاحية: *زمن حش البرسيم المصري.*

Introduction:

Egyptian Clover (*Trifol ium alexanrium*.L)one of common forge and helps in renewal soil organic matter and fertility in the middle east areas (Shirley *et al*.2004).Moreover, Egyptian Clover characterized in weeds control either by mowing or interdict light to the weeds (Norman and Arkebauer.1991)and (Kemanian *et al*.2004). Dolah(1970), find the dry Clover crop yield increased significantly by growth period and time of clipping. (Abdel-Gawad1993)find the mowing for 4 times is the best for Clover production to 160 – 165 DAS. Delaying time of Clover clipping was a best way to increase fresh yield (Narwal and sardana,2000). There a positive correlation between the length of Clover growth periods and fresh an dry yield and a positive correlation with several time of clipping (Dear *et al*.2008).The height of Clover branch increased significant by delaying time of mowing (Badwi.2006).In addition EL-Zanaty(2005) showed that extending time of mowing to six increase both fresh, dry yield and protein content in the forge. Aimed of the study to recognize the time of mowing effects on fresh, dry yield and quality of Clover crop.

Materials and Methods:

Rainfed Clover was grown on coarse loam at EL-Baida in EL-jabal EL- Akhdar 32° 26´ N, 21° 43´E with latitude 488m over sea level during the tow growing seasons 2016-2017 and 2017 – 2018 to evaluation the effect of mowing time (30 ,60k90 and 120 days after sowing (DAS)) on the growth traits (crop growth rate) CGR= $\frac{w2-w1}{t2-t1}$ which w1 , w2 dry Wight after t1 and t2 time.

Richness Index (RI) = S / Log A: S total counts of sample plants and A the sample area.

- Count of Clover plants per m^2.
- Plant height, mean of 10 plant at each time.
- Plant leaves area by using leaf area meter model Nx 1002.
- Specific leaf area (SLA) = leaves area / leaves weight .
- Harvest $50cm^2$ at each time to calculate:
- Fresh weight and change to Kg m^2.
- Drying by oven dry at 80C° for 72h to rest dry weight changed to Kg m^2.
- Forge protein content (%) by using dry digestion and titration with Nessler Solution as described by Hesse (1972) and determine the nitrogen concentration with spectrophotometer (Lx 0085) at wave length 420m and changed the concentration of nitrogen to protein % by multiply by 5.25. The Clover (*Trifolium alexndrium*.L) sowing in 15^{th} and 17^{th} November of both tow season respectively with seed rate 40 Kg ha^{-1} by broadcasting . The experiments designed by RCBD with 4 replicates by using SAS 2008 to analysis the ANOVA and level of significant.

Results and discussion:

The growth traits include:

1- Crop growth rate (CGR) gm^{-2} day^{-1}:

The different in time of mowing showed no significant differences in CGR during both 2 seasons (Table 1) which reflect un affect of crop because might be depend on genetic interaction other than stage of growth, similar finding by (Dear *et al*. 2008).

2- Richen index (RI) branch plant^{-1}:

Data tabulated in table (1) reveled no significant difference in RI which discussed in similar reason of CGR.

3- Number of plants m^{-2}:

Table (1) showed no odds in the plants m^{-2} in both the two seasons. The density depend on the seeding rate and germination percent that no relation to time of mowing.

4- Plant height (cm):

Time of moving exhibited a significant ($p<0.01$) difference in plant height (table 1). Tallest 26.38 and 27.72 cm after 120 days of growth period comparing to smallest 13.77 and 14.11cm after 30 days in both the tow seasons respectively. This difference reflect of time of growth for increase in height, accordance with (sing *et al*, 2005).

5- Specific dry leaves weight per plant (g):

Mowing time showed significant differences ($p<0.05$) (Table 1). Least 15.79 and 16.10 g/plant at 30 DAS comparing to greatest 16.86 g/plant at 30 DAS comparing to greatest 16.86 and 16.98 g plant^{-1} in both the tow seasons, respectively which might be due to length of growing period (phytomers + phyllchron) of each stage similar finding recorded by shaaban(1975).

6- Leaves area per plant (cm^2).

Leaves area during time of mowing (Table 2). Naturally length of growth period increase area that last 13.59 and 14.97 cm^2 plant^{-1} at 30 DAS comparing to greatest 34.21 and 33.92 cm^2 plant^{-1} in both the tow seasons respectively which lined with (singh *et al*. 2005).

7- Fresh forage yield (Kg m^2):

Fresh forge resemble some direction of leaves area plant^{-1}; plant height by significant difference ($p<0.01$) due to mowing time (Table 2), the least 29.52 and 29.16 Kg m^{-2} from 30 DAS comparing to great 60.98 and 58.35 Kg m^{-2} because growth season at suitable conditions increase dry matter accumulation similar discussion showed by (Radwan et al, 1983).

8- Dry forge yield (Kg m^{-2}):

(Table 2)revealed significant differences ($p<0.01$)in forge dry yield during mowing time, Clover willing to accumulate dry matter at growth period progressing. Lightest 11.81 and 11.66 Kg m^{-2} from 30 DAS comparing to heaviest 24.39 and 23.34 kg m^{-2} at 120 DAS in both 2 seasons, receptively, similar finding written by (Radwan *et al*, 1983).

9- Forge protein content(%):

Data in (Table 2) showed significant effect in forge protein content due to mowing time. Least 9.72 and 10.04% due to mowing 120 DAS comparing to the greatest 12.37 and 13.58% when mowing 30 DAS in both tow season receptively. This might be due to dry matter accumulation as find by shaaban(1975).

Conclusion:

Forge of Egyptian Clover improvement in EL-Baida condition involved substantial changes in biomass partitioning at growth stage the fraction of plant dry matter accumulation increased by delaying time of mowing till 120 DAF mean while fraction of forge protein content increased by earlier time of mowing were 30 DAF gave the highest value. In common with many crop species, improved forage yield potential was associated with greater leaves area index and leaves specific area and plant height, which was in turn linked to greater proration of seasonal growth corresponding to forge

yield. More subtle change in partitioning of plant resources peculiar to Clover– included greater LAI, SLW, Plant height and greater protein ratio to time of mowing. Further partitioning cannot be discarded, including increase in growth rate and richen index resulting from enhanced contribution of stored assimilate to forge yield growth. Owing to dramatic change in partitioning achieved in the last seven decades, however, further increase in forge yield may need to focus on increase biomass production.

Table (1): Effect of mowing time on the growth trails of Egyptian Clover under EL-Baida condition during 2016 -17 and 2017 -18 seasons.

Clipping time DAS	CGR Gm^{-2} day^{-1}		Richen index		Plant m^{-2}		Plant height cm		Specific dry leaves Wight percentage	
	St^1 season	Nd^2 season	St^1 season	Nd^2 season	St^1 season	Nd^2 season	St^1 season	Nd^2 season	St^1 season	Nd^2 season
30	0.33	0.25	14.1	13.6	73.8	72.9	14.11	13.77	15.79	16.10
60	0.27	0.30	13.8	13.7	74.7	74.9	21.29	21.70	16.34	16.42
90	0.31	0.36	14.0	13.8	76.4	76.9	25.93	24.46	16.86	16.98
120	0.33	0.37	13.3	13.5	81.3	77.8	27.72	26.38	16.10	16.63
F	N.S	N.S	N.S	N.S	N.S	N.S	**	**	**	**
LSD	-	-	-	-	-	-	2.62	5.19	0.15	0.22

Table (2): Effects of mowing time of Egyptian time Clover on the yield and quality of the forge during the tow season 1st 2016-17and 2nd 2017-18 season at EL-Baida condition.

Clipping time DAS	Leaf area plant-1		Forge fresh weight Kg m^2		Forge dry weight Kg m^2		Forge protein%	
	1^{st} season	2^{nd} season	1^{st} season	2^{nd} season	1^{st} season	2^{nd} season	1^{st} season	2^{nd} season
30	13.59	14.97	29.52	29.16	11.81	11.66	12.37	13.58
60	24.59	27.92	41.09	41.20	16.44	16.48	11.91	10.58
90	29.63	30.12	49.66	49.99	19.86	20.00	10.80	11.54
120	34.21	33.92	60.98	58.35	24.39	23.34	9.72	10.04
F	**	**	**	**	*	**	*	*
LSD	4.22	2.39	4.64	6.75	3.78	2.67	0.37	0.46

N.S not significant at 5% ; significant at 5% level and ** significant at 1% level0.

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