A STUDY OF ROTARY DRUM MOWER BLADE WEAR AND ITS EFFECTS ON FORAGE PRODUCTIVITY

El-Baily, M.M.*

1Agricultural Engineering Research Institute, Dokki, Giza, Egypt

Abstract: Egyptian clover (Trifolium alexandrinum) is the main and oldest cultivated winter forage leguminous crop in Egypt. It occupies about one third of the cultivated area with average of 1.63 million Feddan (Feddan= 4200 m²). With an estimated productivity of about 42.03 million tons of green fodder [7]. In last years, the forage mower conditioner machine used in Egypt to cutting the Egyptian clover crops. The mean objectives of the current research were evaluated the new and wear blades attached in the rotary drum mower conditioner. As well as, study the effect of new and wear blades on the productivity of green fodder under local conditions. The current research carried out in the Sakha Research Station, Egypt during session 2016/2017. The drum mower conditioner was operated by tractor to cut the Berseem Egyptian clover forage crops (Sacha-4) at three different moisture content 65.4%, 57.3 and 46.2 % (d.b.) at second cutting of Berseem (Trifolium alexandrinum). The results indicated that, the average maximum value was 4.96 ton/fed compared with 2.42 ton / fed for Alfalfa moisture content 56.3 %. This result indicated that the wear old blade or wear knife may be going to reduce the productivity as 49.9%. The average maximum value of fuel consumption was 23.04 l/fad compared to 15.4 l/fed for Berseem Egyptian clover forage crops (Sacha-4) moisture content 65.7 %. This result indicated that the old blade or wear knife may be going consumed low values of fuel consumption per L/fed.
This result indicated that the old blade or wear knife may be going reduce the PTO power. The average values of clover forage crops of power requirement were 28.83 hp, 24.9 hp, and 25.0 hp for old knife compared with 47.67 hp, 39.8 hp and 38.27 hp for new blade at 65.7 %, 57.3 % and 46.2 % moisture content respectively.

*Corresponding Author. E-mail address: ebaily_m@yahoo.com
The aim of the present research is evaluated the performance of new and wear blades attached in the rotary drum mower conditioner. As well as, study the effect of new and old blades on the productivity of green fodder under local conditions.

**Keywords:** Drum mower, wear, forage cutting machine

**INTRODUCTION**

Forages are important compared with other agricultural crop and require as much inputs, care, and management. Livestock products are as important in our food chain as cereals. It is not possible to increase the area under fodder so, it is imperative that forage crops become an important component of cropping systems. Integration will add to the availability of fodder but help the alternative crops if leguminous forages are grown. Berseem, Egyptian clover (Trifolium alexandrinum) has achieved the distinction of being designated “king of forages”. Wild in the Levant and domesticated in Egypt in antiquity it has been a base of Egyptian farming, both as fodder and for soil fertility maintenance. Under Egyptian conditions cross-pollination in traditional cultivars, Trifolium alexandrinum and T. repins was up to 82% in the presence of bees. Currently there are 200-300,000 acres of Alfalfa planted in Egypt and acreage is rising each year [27]. Vertical axis mowers avoid many of the complications of reciprocating machines by cutting the crop with freely pivoting blades attached to rotating [28]. The pivoting action of the blades allows them to swing away from rocks and other obstacles. In all rotary mowers, the crop is unsupported during cutting. Thus for a clean cut, the force of cutting must be absorbed by the rigidity of the plant’s stem and its neighbors—there is no counter shear to hold the stem in place. There are two types of vertical axis rotary mowers, disc and drum. Drive mechanisms in disc mowers are located beneath the cutting blades, so crop flows more easily through the machine. This is believed to reduce energy requirements for crop conveyance. Blades may be counter rotating to leave the material in distinct bands or co-rotating for uniform distribution across the cutting width. Drum mowers have their drive mechanism above the blades, and crop is required to pass in the narrower spaces between or under the drums, resulting in higher energy requirements. The combination of the mowers revolution and forward velocity causes the blade to move in a cycloidal path. The ends of blades may be beveled so that the flat portion of the blade does not push into standing crop as the machine advances [28]. In general, the tangential velocity of the blade is much greater than the forward velocity of the mower, so the oblique angle of cutting is near zero. This reduces the number of stems that slide forward and off the blade’s edge, since the cutting surface is oriented perpendicular to the direction of travel. Cutting of plant stems is believed to occur when the pressure caused by the blade reaches a critical value from 9 to 30 N/mm² for most plant materials. Cutting results in multiple modes of tissue failure. Initial knife penetration results in localized plastic deformation, followed by significant buckling as the knife advances.
The turgor pressure of moist stems will often resist initial compression in high speed cutting. As the knife continues to advance the fibers composing the stem are deflected and eventually fail in tension. The plant stem is deformed and compressed ahead of and to the sides of the knife. These compression effects alone may account for 40-60% of total cutting energy [28], [4,5] cites a power requirement of 5.0 kW/m of rotary cutting width. The power requirement for rotary mower conditioners is 8.0 kW/m. Other studies report even higher energy requirements, with 11 to 16 kW/m consumed by the mower at 15 km/h [28] and [26] suggests the following relationship for the power requirements of a rotary mower:

\[ P_{\text{mow}} = (P_s + E_{sc})v_f \]

Where is:
- \( P_{\text{mow}} \) = total power requirement of mower, kW
- \( P_s \) = specific power loss due to friction, kW/m
- \( E_{sc} \) = specific cutting energy, kJ/m²
- \( v_f \) = forward velocity of mower, m/s
- \( W_c \) = width of mower, m

Specific power losses (Pls) range from 1.5 - 4.0 kW/m, with drum mowers experiencing higher losses than disc-type [26]. Specific cutting energy (Esc) ranged from 1.5 - 2.1 kJ/m², depending on blade sharpness. Energy losses in rotary mowers are identified as windage, mower drag, friction within the drive train, and friction with the stubble beneath the blades. Author [25], mentioned that the general formulas for the energy requirements of a flail mower as follow:

\[ P_{\text{flail}} = C_1 + C_2 \times m_f \]

Where is:
- \( m_f \) = mass feed rate of crop material, kg/s
- \( C_1 \) = constant power requirement, kW
- \( C_2 \) = feed rate energy requirement, kJ/kg

Typical values for \( C_1 \) and \( C_2 \) are 10 kW and 4.0 kJ/kg. In addition to flail mowers, other horizontal axis mowers have been developed and tested, such as a compound helical cutter bar [12]. Cutting of plant stems is believed to occur when the pressure caused by the blade reaches a critical value from 9 to 30 N/mm² for most plant materials. Cutting results in multiple modes of tissue failure. Initial knife penetration results in localized plastic deformation, followed by significant buckling as the knife advances. Initial plant penetration is strongly influenced by the fineness of the blade, which is defined by the rake angle. Increasing the oblique angle tends to change the nature of cutting from impact to slicing [28]. Slicing cuts generally require less energy, but increase the tendency for crop material to slide along the blade.
Serrated blades increase friction between the blade and stem, reducing the tendency for material to slide out of the cutting area. Friction between the cutting blade and the underside of the blade was considered a part of the cutting energy, as in in [11]. Since cutting force was not monitored, it was not possible to distinguish these parasitic losses from the energy required to sever the stalk.

OBJECTIVES

The aim of the present research is evaluated the performance of new and wear blades attached in the rotary drum mower conditioner. As well as, study the effect of new and old blades on the productivity of green fodder under local conditions.

MATERIAL AND METHODS

The current research conducted in the Sakha Research Station, Egypt during session 2018/2019. The tractor model Fiat 5560 with engine power 65 hp used to operate the drum mower conditioner model Celmak-Mechanical. The drum mower has 165 cm width to cut the Berseem Egyptian clover forage crops Sacha-4 at three different moisture content 65.4%, 57.3 and 46.2% (d.b.) at second cutting of Berseem (Trifolium alexandrinum). The different trails tests for cutting the Berseem Egyptian clover forage crops Sacha-4 (Alfa-Alfa) were operated at two different total averages operating times 7 hour and 8 hours. The total cutting area for Berseem Egyptian clover forage crops Sacha-4 (Alfa-Alfa) to evaluate different blades was arranged between 10 feddan to 18 feddan. The wear blades were used knives at the end of the operating cutting session and the dimension of the new and wear blade presented as shown in figure 1.

Operating forward speed was adjusted at 4.8 km/h for all trails testes conditions by adjusting the hand throttle control fuel paddle. The cutting height was adjusted at 8 cm from the ground. The three hitch point in hydraulic system was operated at fixed position to control of the cutting height at 8 cm for forage Berseem Egyptian clover forage crops Sacha-4. The energy requirement of rotary drum mower was calculated by using equation 2 for all trail testes conditions. As well as, a tractor with trailer was used to transfer the forage and the total production mass stem was measured after every trail of cutting alfa-alpha by using weight balance of a trailer in Sacha research center. The total productivity or farm capacity of machine calculated by divided the total mass production on the total cutting area. Also, the specific fuel consumption (SFC) was estimated by using the following equation:

\[ \text{SFC} = \frac{\text{fuel consumption with liter}}{\text{total cutting area with fedden}} \]

ASABE Standards [3],[4] are widely used for estimating fuel consumption for determining cost of operations. The most widely used relationship for estimating fuel consumption in gallons per hour (gal/h) is:

\[ Q_{\text{avg}} = \alpha' \cdot P_{\text{PTO}} \quad \text{...} \]
Where as:
QAVG = average diesel consumption (gal/h),
PPTO = rated PTO power (hp),
a’ = 0.044 gal/hph.

The value of the coefficient a’ was estimated to submit the average diesel consumption with (l/h). The equation 3 used to estimate the total rated PTO power for wear and new blades at different trial testes conditions. The fuel consumption was measured by using the graduated cylinder and stop watch.

Wear is a process of gradual removal of a material from surfaces of solids subject to contact and sliding. Damages of contact surfaces are results of wear. They can have various patterns (abrasion, fatigue, ploughing, corrugation, erosion and cavitation). The wear depth profile of a surface is a useful measure of the removed material. The wear depth can be estimated with the aid of wear laws, [24]. Derived in this study, constitutive equations of anisotropic wear are extensions of the Archard law of wear.

The amount of wear can be specified in terms of direct or indirect quantities. Indirect quantities are often used in technical assessments of the lives of machinery and in practical engineering.

Direct wear quantities specify the change in mass, geometrical dimensions or volume of the wearing body.

The wear could be illustrated as follows:
- wear amount:
- mass loss (kg)
- linear dimensional change (m)
- volume loss (m^3)
- wear resistance = (1/wear amount), m^-1, m^-3, and kg^-1 … (4)
- wear rate= (wear amount/sliding distance or time) (m/m, m^3/m, kg/m, m/s, m^3/s, kg/s)  
Author [14]. (5)

The primary measurement from which these quantities are derived is usually mass loss, dimensional change or volume loss, although other methods can also be used.

The two different knives wear blade and new blade were constructed and used under field condition at the above three moisture contents. The differences between the weight of new and old blades was in both dimensions and materials of the blades was measured. The average weight was 50.61g for wear blades and 103.2 g for new blades. The weight loss of blade was 52.59 g (0.0526kg). As well as, the dimensional sliding distance change and volume loss were 0.0278 m and 0.0062 m^3 respectively.

The equation 4 and 5 used to calculate the wear rate and wear resistance. The average wear rate in rotary drum was 18.92 kg/m (0.0526 kg/0.0278 m) or 8.48 kg/m^3 for constructed old blades. Also, the wear resistance rate in rotary drum was for constructed old blades 19.23 kg^-1 for constructed old blades.
Table 1: The technical specification of Mechanical drum mower conditioner

| Model Celmak - Mechanical drum mower 165 cm. | dimension |
|---------------------------------------------|-----------|
| Cutting width                               | 1650 mm   |
| Number of drums                             | 2         |
| Number of cutting blades                    | 6         |
| Tractor power                               | 30 kW     |
| Length                                      | 2 750 mm  |
| Width                                       | 990 mm    |
| Height                                      | 1 100 mm  |
| Weight                                      | 400 kg    |
| Working capacity                            | 1.5 ha/h  |
| P.T.O                                       | 540 rpm   |
| Skid plates                                 | 6 mm      |

RESULTS AND DISCUSSION

The result indicated that the wear knife or old blades in mechanical drum mower conditioner tends to decrease the total production and productivity of Berseem Egyptian clover forage crops Sacha-4 (*Trifolium alexandrinum*) as shown in table 2. As well as, the productivity (ton / fed.) will be decrease when using the wear blade during the operation. Figure 2 illustrated the effect of wear blade on the production of cutting Berseem Egyptian clover forage crops Sacha-4 under three moisture contents. The average maximum productivity of Berseem Egyptian clover forage crops Sacha-4 value was 4.96 ton/fed compared to 2.42 ton / fed for moisture content 56.3 %. This result indicated that the old blade or wear knife may be going to reduce the percentage of productivity as 49.9%.

The average values of Berseem Egyptian clover forage crops Sacha-4 yield were 2.63 ton/fed, 2.42 ton/fed, and 2.18 ton/fed for wear knife at 65.7 %, 57.3 % and 46.2 % moisture content respectively.

Fig. 1. The wear blades or old blades used in Mechanical drum mower conditioner
Also, the average values of Berseem Egyptian clover forage crops Sacha-4 yield were 4.3 ton/fed, 4.98, and 4.11 ton/fed for new blade mower drum conditioner 65.7 %, 57.3 % and 46.2 % moisture content respectively. Figure 3 and table 3 illustrated that the effect of wear knife or blades in drum mower conditioner on feeding rate at different trails conditions. The wear blade tends to reduce the feeding rate of Berseem Egyptian clover forage crops Sacha-4 during the operation as shown in table 3. As well as, the feeding rate will be increasing when using the new blade compared to wear blade. Figure 3 illustrated the effect of blade wear on the feeding rate of cutting Berseem Egyptian clover forage crops Sacha-4 for three moisture content. The average maximum value of feeding rate was 9.42 ton/h compared to 4.71 ton/h for Berseem Egyptian clover forage crops Sacha-4 moisture content 65.7%.

The average values of feeding rate Berseem Egyptian clover forage crops Sacha-4 were 4.71 ton / h, 3.72 ton / h, and 3.75 ton / h for old knife at 65.7 %, 57.3 % and 46.2 % moisture content respectively. Also, the average values of feeding rate of cutting Berseem Egyptian clover forage crops Sacha-4 were 9.42 ton / h, 7.45 ton/h and 7.06 ton/h for new blade mower drum conditioner 65.7 %, 57.3 % and 46.2 % moisture content respectively. Table 2 illustrated that the effects of wear blades in mechanical drum mower conditioner on the fuel consumption L/fed at different trails conditions. As well as, the fuel consumption may be it is an indicator to know the wear in blades of mower conditioner. Figure 4 illustrated the effect of blade wear on the fuel consumption of cutting Berseem Egyptian clover forage crops Sacha-4 for three moisture content. The average maximum value of fuel consumption was 3.14 L/fed compared to 4.26 for both old and new blade at moisture content 65.7 % of Berseem Egyptian clover forage crops. This result indicated that the old blade or wear knife may be going consumed low values of fuel consumption per L/fed. As well as, the average values of fuel consumption were 3.14 L/fed, 2.86 L/fed and 3.2 L/fed for old knife at 65.7 %, 57.3 % and 46.2 % moisture content respectively. Also, the average values of fuel consumption were 4.26 L/fed, 3.75 L/fed and 4.28 L/fed for new blade mower drum conditioner 65.7 %, 57.3 % and 46.2 % moisture content respectively. The fuel consumption may be used as indicator to change the blades in mower conditioner. Table 3 illustrated that the effects of wear blades in mechanical drum mower conditioner on PTO power requirement at different trails conditions. As well as, the PTO power requirement may be reduced due to increasing of the wear blades in conditioner. Figure 4 illustrated the effect of blade wear on the PTO power requirement of cutting Alfalfa for three moisture content. The average maximum value of PTO power requirement was 47.67 hp compared to 28.83 hp for both new and old blades respectively at moisture content 65.7 %. This result indicated that the old blade or wear knife may be going to reduce the PTO power and it means that the blades most be changing. The average values of cutting the Berseem Egyptian clover forage crops Sacha-4 of power requirement were 28.83 hp, 24.9 hp, and 25.0 hp for old knife at 65.7 %, 57.3 % and 46.2 % moisture content respectively. Also, the average values of power requirement for cutting Berseem Egyptian clover forage crops Sacha-4 were 47.67 hp, 39.8 hp and 38.27 hp for new blade mower drum conditioner 65.7 %, 57.3 % and 46.2 % moisture content respectively.
CONCLUSIONS

The result indicated that the old or wear knives tend to reduce the performance of rotary drum mower production. The average maximum value was 4.96 ton/fed. Compared to 2.42 ton / fed for Alfalfa moisture content 56.3 %.

The result indicated that the old blade or wear knife may be going to reduce the PTO power. As well as, the fuel consumption may be it is an indicator to know the wear in blades of mower conditioner. The reduction of productivity and specific fuel consumption l/fed may be used as an indicator to change the blades in drum mower conditioner.

Figure 2. The effect of old blades used in mechanical drum mower conditioner on the productivity of cutting

Figure 3. The effect of old blades used in mechanical drum mower conditioner on the feeding rate of cutting forage Alfalfa
Fig. 4: The effect of old blades used in mechanical drum mower conditioner on the fuel consumption L/1 fed of cutting forage Alfalfa

Fig. 5: The effect of old blades used in mechanical drum mower conditioner on PTO power requirement of cutting forage Alfalfa
Table 2: Display the measured data for old and new knife in drum rotary mower conditioner Model Celmak

| Trails | Blade | MC, % | Oper. time, hr | Total cutting area, fad | Total production, ton | Productivity, ton/hr |
|--------|-------|-------|----------------|------------------------|-----------------------|-----------------------|
| T1     | old   | 65.4  | 7              | 18                     | 36.32                 | 2.02                  |
| T2     | old   |       | 7              | 10                     | 37.77                 | 3.78                  |
| T3     | old   |       | 7              | 12                     | 22.32                 | 1.86                  |
| T4     | old   |       | 7              | 12                     | 35.47                 | 2.95                  |
| T1     | old   | 57.3  | 8              | 12                     | 32.23                 | 2.69                  |
| T2     | old   |       | 8              | 12                     | 28.47                 | 2.37                  |
| T3     | old   |       | 8              | 12                     | 30.24                 | 2.52                  |
| T4     | old   |       | 8              | 12                     | 32.34                 | 2.69                  |
| T5     | old   |       | 8              | 12                     | 28.16                 | 2.35                  |
| T1     | new   | 65.4  | 7              | 18                     | 72.64                 | 4.04                  |
| T2     | new   |       | 7              | 16                     | 75.53                 | 4.72                  |
| T3     | new   |       | 7              | 12                     | 44.64                 | 3.72                  |
| T4     | new   |       | 7              | 12                     | 70.93                 | 4.72                  |
| T1     | new   | 57.3  | 8              | 12                     | 64.45                 | 5.37                  |
| T2     | new   |       | 8              | 12                     | 56.93                 | 4.74                  |
| T3     | new   |       | 8              | 12                     | 60.47                 | 5.04                  |
| T4     | new   |       | 8              | 12                     | 64.67                 | 5.39                  |
| T5     | new   |       | 8              | 12                     | 56.31                 | 4.69                  |
| T1     | new   | 46.2  | 7              | 12                     | 46.64                 | 3.89                  |
| T2     | new   |       | 7              | 12                     | 52.08                 | 4.34                  |
| T3     | new   |       | 7              | 12                     | 51.20                 | 4.27                  |
| T4     | new   |       | 7              | 12                     | 50.48                 | 4.21                  |
| T5     | new   |       | 7              | 12                     | 55.68                 | 4.64                  |
| T6     | new   |       | 7              | 12                     | 52.72                 | 4.39                  |
| T7     | new   |       | 7              | 12                     | 39.04                 | 3.25                  |
Table 3: Display the effect of wear knife blades in vertical rotary disc mower to mower the alfalfa crop (*Trifolium alexandrinum*) on power requirement, fuel consumption

| Trails | Blade | MC, % | feeding rate, ton/h | sp fuel consumption, L/fed | FC, L/h | PTO Power, hp |
|--------|-------|-------|---------------------|-----------------------------|--------|---------------|
| T1     | old   | 65.4  | 5.19                | 2.87                        | 2.57   | 30.75         |
| T2     | old   |       | 5.40                | 2.85                        | 1.43   | 31.58         |
| T3     | old   |       | 3.19                | 2.88                        | 1.71   | 22.75         |
| T4     | old   | 57.3  | 5.07                | 2.85                        | 0.71   | 30.27         |
| T1     | old   |       | 4.03                | 3.13                        | 1.50   | 26.11         |
| T2     | old   |       | 3.56                | 3.15                        | 1.50   | 24.23         |
| T3     | old   |       | 3.78                | 3.16                        | 1.50   | 25.12         |
| T4     | old   |       | 4.04                | 3.12                        | 1.50   | 26.17         |
| T5     | old   |       | 3.52                | 3.16                        | 1.50   | 24.08         |
| T1     | old   | 46.2  | 3.33                | 3.34                        | 1.71   | 23.33         |
| T2     | old   |       | 3.72                | 3.34                        | 1.71   | 24.88         |
| T3     | old   |       | 3.66                | 3.31                        | 1.71   | 24.63         |
| T4     | old   |       | 3.61                | 3.32                        | 1.71   | 24.42         |
| T5     | old   |       | 3.98                | 3.32                        | 1.71   | 25.91         |
| T6     | old   |       | 3.77                | 3.34                        | 1.71   | 25.06         |
| T1     | New   | 65.4  | 10.38               | 4.28                        | 2.57   | 51.51         |
| T2     | New   |       | 10.79               | 4.28                        | 1.43   | 53.16         |
| T3     | New   |       | 6.38                | 4.28                        | 1.71   | 35.51         |
| T4     | New   |       | 10.13               | 4.23                        | 0.71   | 50.53         |
| T1     | New   | 57.3  | 8.06                | 4.26                        | 1.50   | 42.23         |
| T2     | New   |       | 7.12                | 4.26                        | 1.50   | 38.47         |
| T3     | New   |       | 7.56                | 4.26                        | 1.50   | 40.24         |
| T4     | New   |       | 8.08                | 4.26                        | 1.50   | 42.34         |
| T5     | New   |       | 7.04                | 4.26                        | 1.50   | 38.16         |
| T1     | New   | 46.2  | 6.66                | 3.75                        | 1.71   | 36.65         |
| T2     | New   |       | 7.44                | 3.75                        | 1.71   | 39.76         |
| T3     | New   |       | 7.31                | 3.72                        | 1.71   | 39.26         |
| T4     | New   |       | 7.21                | 3.75                        | 1.71   | 38.85         |
| T5     | New   |       | 7.95                | 3.75                        | 1.71   | 41.82         |
| T6     | New   |       | 7.53                | 3.75                        | 1.71   | 40.13         |
| T7     | New   |       | 5.58                | 3.75                        | 1.71   | 32.31         |
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PROUČAVANJE SEČIVA NOŽeva ROTACIONE KOSAČICE I NJIHOVI EFEKTI NA PROIZVODNJU ZELENE MASE

El-Baily, M.M.1

1Agricultural Engineering Research Institute, Dokki, Giza, Egypt

Apstrakt: Egiptanska detelina (Trifolium alexandrinum) je glavna i najstarija gajena zimská krmná leguminoza u Egiptu. Zauzima oko jedne trećine obradivih površina sa prosekom od 1,63 miliona fedana (feddan=4.200 m²), a procenjeni prinose od oko 42,03 miliona tona zelene mase [7].

Poslednjih godina mašina za kondicioniranje zelene mase u Egiptu je kosačica sa vertikalnim rotacionim bubnjevima sa noževima, koja se uspešno koristi za košenje deteline. Srednji ciljevi trenutnog istraživanja su procenjeni na novim i istrošenim noževima postavljenih na vertikalne rotacione bubnjeve

Takođe, proučen je uticaj novih i istrošenih rotacionih noževa na prinos zelene stočne hrane u lokalnim uslovima. Trenutno istraživanje sprovedeno u istraživačkoj stanici Sakha, Egipt. Egiptu u toku perioda 2016/2017. Kosačica je agregatirana na traktor i obavljeno je košenje egipatske deteline Berseem (tip Sacha-4) sa tri različita sadržaja vlage 65,4%, 57,3 i 46,2% (w.b.).
Urađeno je drugo košenje deteline tipa Berseem (Trifolium alexandrinum). Rezultati su pokazali da je prosečna maksimalna vrednost prinosa iznosila 4,96 tona u poređenju sa 2,42 tone za Alfalfa sa sadržajem vlage od 56,3 %.

Ovaj rezultat je pokazao da staro sečivo rotacionog noža zbog istrošenosti, habanja smanjuje produktivnost za 49,9%. Prosečna najveća vrednost potrošnje goriva iznosila je 23,04 L/fad za košenje deteline tipa Trifolium alexandrinum, u poređenju sa 15,4 L/fad za egipatsku detelinu Berseem (tip Sacha-4) sa sadržajem vlage 65,7 %.

Rezultat ukazuje da novo sečivo ili nož ima manje vrednosti potrošnji goriva u L/Fed, kao i da staro sečivo ili nož zbog habanja smanjuje dobijenu snagu izlaznog vratila PTO. Prosečne vrednosti zahtevane snage traktora (KS) za košenje deteline bile su 28,83; 24,9 i 25,0 za stari nož pri 65,7 % sadržaju vlage, u poređenju sa 47,67; 39,8 i 38,27 za novo sečivo i sadržaj vlage 65,7 %, 57,3 % i 46,2 % respektivno.

Cilj ovog istraživanja je procena performansi novih i istrošenih noževa postavljenih na rotacione bubnjevke kosačice. Takođe, proučavanje je uticaj novih i starih noževa na prinos zelene stočne hrane u lokalnim uslovima.

**Ključne reči:** kosačica sa bubnjem, habanje, mašina za sitnjenje stočne hrane

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