

Sowed pastures in the South-Eastern Romanian Plain

ABSTRACT

The objective of this study was the identification of the mixtures with elite traits for provide some high quality fodders, in adequate quantity too, and the tilled areas sowed with pastures are even larger. Previously, most farms in the area were cultivated only by alfalfa (the most important fodder variety in the area). Lately, there have been sowed pastures with variety mixtures (Graminaceae and Leguminous varieties) which have superior fodder value. This is possible as better adapted to the natural conditions specific to the area. The results obtained in the first year of harvest (2016) characterized by climate conditions over the area average show that the medium annual production of the three mixtures reached the value of 88.7 t/ha, having the same level as the yield obtained by an alfaalfa fodder crop (*M. sativa*), a crop for this area. The highest part of the year yield was achieved with the first two harvest over 60% from the total. The shortage of uniformity for the climate factors during the vegetation period leads to a non- uniformous distribution of the yield on reapings. Also, the yield obtained with the 3rd mixture is lower (84 t/ha) as a consequence of the white trefoil. (*T. repens*) lower adjustment to the droughty climate conditions.

Keywords: Artificial Pasture, Sowed pastures ,Temporary pasture

1- INTRODUCTION

Some centuries ago in the South –Eastern part of Romania was covered with large grass areas characteristic to steppe area equivalent to savanna, prairie, and pampas [1]. Mixed cropping,

26 also known as polyculture, inter-cropping, or co-cultivation, is a type of agriculture that
27 involves planting two or more plants simultaneously in the same field, interdigitating the
28 crops so that they grow together. In general, the theory is that planting multiple crops at once
29 saves space since crops in the same field might ripen at different seasons, and provides a
30 wealth of environmental benefits. Documented benefits of mixed cropping include the
31 balance of input and outgo of soil nutrients, the suppression of weeds and insect pests, the
32 resistance of climate extremes (wet, dry, hot, cold), the suppression of plant diseases, the
33 increase in overall productivity and the management of scarce resources (land) to the fullest
34 degree [2]. Agronomists studying mixed crops have had mixed results determining if yield
35 differences can be achieved with mixed versus monoculture crops. For example, a
36 combination wheat and chickpeas might work in one part of the world, but it might not work
37 in another. **However**, overall it appears that measurably good effects result when the right
38 combination of crops are cropped together. Mixed cropping is best suited for small-scale
39 farming where harvesting is by hand. It has been used to improve income and food
40 production for small farmers and lessen the likelihood of total crop failure—even if one of
41 the crops fail, the same field might still produce other crop successes [3-4]. Mixed cropping
42 also requires fewer nutrient inputs such as fertilizers, pruning, pest control and irrigation than
43 does monoculture farming. There seems to be no doubt that the practice provides a rich
44 biodiverse environment, fostering habitat and species richness for animals and insects such as
45 butterflies and bees. Some evidence suggests that polycultural fields do produce high yields
46 compared to monocultural fields in certain situations, and almost always increase biomass
47 richness over time. Polyculture in forests, heathlands, grasslands, and marshes has been
48 particularly important for the regrowth of biodiversity in Europe. A recent study (Pech-Hoill
49 and colleagues) was conducted on the tropical American perennial achiote (*Bixa orellana*), a
50 rapidly growing tree that has a high carotenoid content, and a food dye and spice in small

51 farming cultures in Mexico. The experiment looked at achiote as it is grown in different
52 agronomic systems—intercropped polyculture, backyard cultivation including poultry
53 farming, and a wide range of plants, and monoculture. Achiote adapted its mating system
54 depending on which type of system it was planted in, specifically the amount of outcrossing.
55 Further research is required to identify the forces at field [5-7]. As these large field areas have
56 been sowed with specific agricultural crops. The areas left with the initial vegetation (steppe)
57 have significantly diminished below 5 % [8]. These areas are generally present with river
58 meadows that cross the area or with areas provided with high natural slope which don't allow
59 mechanized agricultural works [9-11]. The results of previously study showed that the
60 production potential of these steppe natural pastures is very low [12-14]. For this reason, in
61 order to protection of local herbivorous animals with necessary fodders, ever larger areas
62 from the cropped area (tillable area) are sowed with fodder mixtures made of perennial
63 graminaceae and leguminous varieties with superior fodder value and high production
64 potential. To this end, there are tested different types of graminaceae and leguminous
65 mixtures within specific research programs, and also the best adapted to specific natural
66 conditions of the area are considered. The objective of this study was the identification of the
67 pasture with this elite traits and meeting this major practical important desideratum.

68

69 2- MATERIALS AND METHODS

70 The research done in the experimental didactical field from Moara Domnească, Ilfov
71 country, agricultural farm of USAMV Bucharest. The harvest was 2015 that experiment start
72 the same year. There are tested 3 mixtures of perennial fodder varieties (graminaceae and
73 leguminous) made of two graminaceae crops (*Dactylis glomerata* and *Festuca arundinaceae*)
74 and two leguminous crops (*Medicago sativa* and *Trifolium repens-Ladino*) with participation

75 shares in different mixtures (Table 1). The mixtures are maintained and exploited according
76 to technological norms specific to these crop areas. The mixtures with *Medicago sativa* (1
77 and 2) are about to be used only by threshing, while mixture no. 3 with *Trifolium repens* –
78 *Ladino*, is more appropriate to harvest by grazing. The presence of *Festuca arundinacea*
79 varieties in the 2nd and the 3rd mixtures aims at testing its good adjustment to the droughty
80 climate conditions specific to the area.

81 In terms of climate, this area is the driest area in Romania: The medium multiannual
82 temperature is 11.5 °C. The coldest month of the year is January with -4 °C, and the warmest
83 months is June, July and August with over 21.2 °C; 23.1 °C and 22.1 °C, respectively.
84 Medium high temperatures in summer months trigger high water shortages in the soil with
85 significant effect over the production.

86 Multi-annual medium rainfall reach 428 mm/year and don't have a uniformous
87 distribution. The driest months of the year are January/February and August/
88 September. The period with the most important rainfall is May/ June/ July, but these ones are
89 most of the times torrential. The low rainfall volume in the vegetation period (April-
90 September), with a total amount of 290 mm and with their dominant torrential characteristics
91 lead to the water waste by leaking at the surface or evaporation. These climate traits
92 characterize the area as droughty with negative impact on the productions level. In the
93 irrigations absence, the solution to obtain good **yield** for perennial fodder mixtures is the
94 choice of some varieties with better adjustment to these conditions.

95

96 3- RESULTS

97 In order to test the production potential of the three mixtures over 4 years of harvest
98 (2016-2019), one reaps the grass from the mixtures in blooming/ early florescence for both

99 leguminous *M. sativa* and *T. Repens*. The year 2016 is the first year for testing the production
 100 potential of mixtures, and the results of test in this year showed in Table 1.

101 Table 1: Green mass yield on harvest and year in 2016 (t/ha)

No.	Mixture	Share in the mixture (%)	Yield on reaping				
			C1	C2	C3	C4	C5
1	<i>Dactylis glomerata</i>	40	28	25	20	15	88
	<i>Medicago sativa</i>	60					
2	<i>Dactylis glomerata</i>	20	31	26	21	16	94
	<i>Festuca arundinacea</i>	20					
	<i>Medicago sativa</i>	60					
3	<i>Dactylis glomerata</i>	40	30	21	18	15	84
	<i>Festuca arundinacea</i>	30					
	<i>Trifolium repens-</i>	30					
	<i>Ladino</i>						
Mixtures average			29.7	24	19.7	15.3	88.7

102
 103 The highest productions were obtained with the first reaping (between 28-31 t/ha)
 104 followed by the second reaping with 21-26 t/ha. The medium yield on reaping obtained from
 105 the three mixtures is of 29.7, 24, 19.7 and 15.3 t/ha green mass. The average production
 106 reached the amount of 88.7 t/ha. Green mass yield distribution on harvest was not
 107 uniform, and the results are presented in Table 2.

108 Table 2: Green mass yield share on reaping

Amestecul	c1	c2	c3	c4
1	32	28	22	18
2	33	27	22	18
3	35	25	21	19

109
 110 The highest share in the total yield which the 1st reaping has is over 30% (32-35). The
 111 2nd reaping has a share over 25% (25-28). The 1st and the 2nd harvest have a significant share,
 112 namely a value of over 60%. This value is determined by the water reserve in the soil as a
 113 consequence of the snow melting and of the moderate temperatures of the spring months

114 (March, April and May). The lower share of the 3rd and 4th harvest is determined by the
115 drought in the summer months associated with the air medium temperatures of over 20 °C ,
116 fact which leads to a very high evapo-transpiration.

117

118 4- DISCUSSION

119 High crop yields are a principal objective of modern agriculture. Plant breeding has
120 achieved high crop yields through hybridization and selection of superior plants. These
121 superior types are often grown in monocultures where each plant is genetically identical to its
122 neighbor. The genetic uniformity for plant height, maturity, and quality characteristics also
123 facilitates harvesting, marketing, and processing of the crop. In this study, to test the
124 production potential of the three mixtures over 4 years of harvest (2016-2019), one reaps the
125 grass from the mixtures in blooming/ early florescence for both leguminous *M. sativa* and *T.*
126 *Repens*. The results showed that Green mass yield (2016) can include duration of the crop
127 over 8 t/ha. This yields level is close to the one of the alfaalfa yield (*M. sativa*), usual fodder
128 crop for this geographical area. The higher productions were found with the alfaalfa mixtures
129 (*M. sativa*) respectively 88 t/ha –the 1st mixture and 94 t/ha the second mixture . The 3rd
130 mixture with white trefoil (*T. repens*) achieved only 84 t/ha. The lower yield of this mixture
131 is led by the fact that the leguminous variety (*T. repens*) is weaker adapted to the drought
132 conditions by comparison with *M. sativa*. The highest productions were obtained with the
133 first reaping (between 28-31 t/ha) followed by the second reaping with 21-26 t/ha. The results
134 of obtained in the first year of harvest (2016) characterized by climate conditions over the
135 area average show that the medium annual production of the three mixtures reached the value
136 of 88.7 t/ha, having the same level as the yields obtained by an alfaalfa fodder crop (*M.*
137 *sativa*), a normal crop for this area. Wolfe [15] defined cultivar mixtures as "mixtures of

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138 cultivars that vary for many characters including disease resistance, but have sufficient
139 similarity to be grown together." The results showed the cultivar mixtures do not cause major
140 changes to the agricultural system, generally increase yield stability, and in some cases can
141 reduce pesticide use.

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143 5- CONCLUSIONS

144 In finally, The highest part of the year yield was achieved with the first two harvest over 60
145 % from the total. The shortage of uniformity for the climate factors during the vegetation
146 period leads to a non- uniformous distribution of the yield on reapings. Also, the yield
147 obtained with the 3rd mixture is lower (84 t/ha) as a consequence of the white trefoil (*T.*
148 *repens*) lower adjustment to the droughty climate conditions. By setting up pastures sowed
149 with perennial, graminaceae and leguminous mixtures, one obtains yields at least equal with
150 the one can obtain yield on par with a crop of Alfalfa (*M. sativa*) specific to the area and with
151 superior quality traits .

152 Ethical Approval:

153 As per international standard or university standard ethical approval has been collected and
154 preserved by the authors.

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