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Research Article

Characterization of Two Oasis Luzerns (El Menea, Tamentit) at the Floral Bud and Early Flowering Stages

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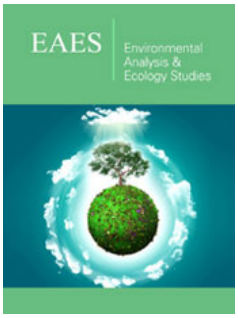

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Abstract

Adrar's oasis with great ingenuity knew, taking into account the harshness of pedoclimatic conditions, to adapt the means of production to Lucerne. We compared 2 oasis alfalfa cultivars through biometric and chemical parameters at two phenological floral and early flowering stages. The quality of these is correlated with the phenological stages. Indeed, the older the plant, the greater the assimilation of mineral matter; But the needs at the floral button stage are higher than at the early bloom stage. The highest value of MAT is 38.7% in El Menea at the floral bud stage and the lowest is 20.8% in the same cultivar at the same stage at the second mowing. The ratio of leaves to stems in green and dry is higher in Tamentit than in El Menea in both stages, resulting in better digestibility. At the initial flowering stage this ratio, in dry, decreases from 1.51 to 1.04. With the same planting rate, the Tamentit population has an average plant per square meter lower than El Menea, ie 15.8 at the floral bud stage, as well as lower values of the other 2 parameters, height of stems and number of stems per square meter. The summer season and the second year of operation encourage the increase in the number of stems and the spring season favors the height of the stems. The difference between the green and dry yields of the two cuts is not significant. So, alfalfa El Menea is more productive than Tamentit which has better digestibility.

Keywords: Alfalfa; Chemical composition; Morphology; Oasis; Yield

Introduction

The Algerian Oasis cover 63,000ha (Ziban, Oued Righ, El Oued and Ouargla, Mzab, Touat, Gourara). The oasien knew, taking into account the roughness of the climatic conditions, the scarcity of water resources, the low quality of the soils, the risks of rising salts, with great ingenuity to adopt means of production and mode of production appropriate; it is the labor of men that permits the outbreak of the Oasis [1]. The species formed are defined as low formation, the species are perennial and annual erected, without trees most of the time and to bare soil. The soil appears in varying proportions [2]. However, Algeria should ensure the maintenance of oasis systems and their shelter as food crops [3]. According to [4], the feeding of livestock in the Oasis certainly passes through a judicious choice of species and races adapted to the potential of local plant production. In an environment that is unfavorable to life, the combined use of legumes that can improve soil nitrogen reserves and ruminants able to use parietal carbohydrates for energy is a key means of boosting the prosperity of the soil, Oasis. According to [5], where the cultivation of this legume grew, it is because there is the possibility of watering. If the soil is fertile, there are 6 to 10 cuts annually in this country [6], advocates under the Saharan conditions of Morocco 16000m^3/ha/year. However, the root system power allows it to withstand a drought of 2 to 3 months.

From a geographical point of view, the region of study, Wilaya d'Adrar, consists of three regions: Gourara (chief town, Timimoune), Touat (chief town, Adrar) and Tidikelt (chief town, Aoulef) [7]. This oasis system is home to several species that ensure a certain food independence of the inhabitants. They are local resources available, produced, multiplied and conserved by local populations. Some of these resources were widely used by the populations of northern Algeria. A harmonious system of life where dates, cereals, goat milk,

sheepmeat, various vegetables, food legumes and adapted rustic fruit trees have always provided a complete ration [3]. The Oasis of the Phoeniculture are a typical example of soil rich in biodiversity. The Touat-Gourara and Tidikelt regions have an animal potential, which, due to their fertility, is safe for their adaptation to ecological conditions and which deserve particular attention. These are the D'Men and Sidaoune sheep breeds. Next comes the goat, the camelin and finally the cattle breeding which remains concentrated mainly at the level of peasant self-help groups (GEP, great development). The main obstacle to improving livestock production in these areas is poor livestock feeding. Apart from a few fodder species mainly oats, millet, sorghum, fodder carrot and hchef (mummified dates), livestock feed is composed of household waste and crop residues [8]. At the level of these regions, there is a subsistence agricultural activity with irrigation made by the system of foggara. This region is famous for the production of alfalfa, a population bears its name (alfalfa de Tamentit) however small areas are reserved for him [9].

Alfalfa is very well adapted to the Saharan climate with abundant production and staggered throughout the year is highly appreciated by the farmers of the region. Its powerful radicular system loosens the soil in depth and allows a nitrogen balance of interest for the following crop (source of economy for the farmers of the region). Very appreciated by the livestock, both in green and dry, this forage is rich in nutrients, mainly digestible nitrogen, vitamins and minerals (2.5kg of alfalfa hay is 1UF). The varieties or populations encountered have several origins; apart from the local variety of Tamentit multiplied in the region and undergoing the same selection pressures for years, one meets the lucerne of El Menea, Ghardaïa, In Salah, Timimoun, Moapa (Italy) and a variety originating in Arabia Saudi Arabia [8]. The quality of alfalfa has often been correlated with the phenological stages of the plants or the age of the regrowth. In this context, we want to compare, after measuring the biometric parameters, two phenological stages (budding or floral budding and beginning of flowering) of two Algerian Saharan cultivars, El Menea and Tamentit, sown in the INRAA research station of Adrar.

Material and Methods

The experimental site

The experimental station of INRAA covers an area of 69ha and is located in the erg in Oueld Aïssa 5km south of the main place and in the heart of Touat. It is the most southerly research center of INRA (it was created in 1951); it is at an altitude of 278 meters at 27° 49' north latitude and 00° 11' west longitude. The reg on which the station is situated results from the transformation of sandstones called "intercalary continental"; the superficial horizon consists of a layer of pebbles and gravels disengaged from the sand by the action of the wind.

The plant material

In this experimental station of the INRA of Adrar, two luzernières are installed mainly for the production of the seed and secondarily to feed the sheep herd (D'Men race) in place. The plots are located under the Takarbouche palms as breeze to the west of the station. There was no cultural precedent for this soil.

Tillage

Tillage began on 30/09/2011, the stages of which were:

A. Elimination of stones.

B. First irrigation on 18/10/2011 to discover the slope of the plot and to wash its salt and to motivate the weeds to push to eliminate them.

C. Plowing on 24/10/2011, with the cover crop at a depth of 2cm to clean the soil and for its aeration and to expose the insects to the solar rays and to realize a thin layer of seedlings to facilitate the rooting.

D. The organic fertilizer was applied on 25/10/2011 at the rate of 30t/ha which gives 29,16kg for 97,2m^2.

E. On 26/10/2011, superficial ways were performed. A rotary cultivator started breaking clods and at the same time mixing the fertilizer from the bottom and refining the soil. This is an introduction to sowing and to facilitate the passage of water and to homogenize the growth of the forage.

F. On 26/10/2011, there was a distribution of the boards: the plot was divided into 9 equal basins 1.80m wide and 6m long.

Seeding

The plots of El Menea and Tamentit were divided into 9 equal basins of 1.80m in width and 6m in length. Planting was carried out on 31/10/2011, at a rate of 13kg of seed per basin. Calculated from 12kg/ha . The on-line seeding was done on 14/11/2011. Between two lines there was 30cm; the number of lines was 4, including two for barley to warm it and protect it from the cold (plant nurse).

Irrigation

Irrigation was by submersion; the water was salted at 4.3g/l. But for Tamentit pivots have been placed, because it is difficult to resume.

Maintenance fertilizer

Nitrogen fertilization was added to 46% in the form of urea which corresponds to 60g per basin on 19/12/2011. The technique of sand supply is also practiced on alfalfa at least once a year after mowing to allow a good restart (this same practice was noted by Toutain, 1977 in Saharan regions in Morocco).

Weeding

Because the test was in the form of ponds, the weeding was manual, carried out during the periods 19/01/2012 and 22/03/2012. Subsequently, the successive swaths cleaned the plot.

Soil analysis

On the surface the soil has pebbles that prevent the wind from transporting sand. The results of its analysis (Table 1) show that the soils in this region are in the sandy-sandy-sandy-clayey texture with 70% sand. They have pH values ranging from (7.91 to 8.36) to (8.01 to 8.76) (alkaline to highly alkaline), with very low electrical conductivity (C.E.<1.17dS/m); indicating the absence of salinity

(healthy soils), limestone levels varying from 12.33, 12.6% to 13%, which means that the soil is moderately calcareous. For the fertility parameters, the organic matter content is between 3.95% and 5.09% for the surface horizon, which means that it is well provided, on the other hand for the subsurface horizon the rate is 0.47%, at 0.55%, very poor.

Table 1: Essential physicochemical characteristics of the soil of the Adrar site. Pbm: Party by million, OM: Organic Material.

Depth	Phospho-rus pbm	Potassium meq/100g	Ph	CEE	N%	Number of caco3%	Carbone ppm	O M%	Na en pbm	K en pbm	Mg en pbm	Ca en pbm	meq/100g de sol Na
ElMenea 20cm	0,646	0,206	8,36	0,709	0,504	12,667	2,956	5,096	8,18	15,62	6,8	38,48	0,356
ElMenea 40cm	0,441	0,276	7,91	1,177	0,392	13,000	0,558	0,963	6,96	15,73	6,63	36,82	0,303
Tamentit 20cm	0,595	0,176	8,76	0,382	0,486	12,333	2,293	3,954	7,02	12,4	6,83	38,81	0,305
Tamentit 40cm	0,545	0,188	8,01	0,403	0,411	12,667	0,274	0,473	7,44	27,45	6,87	47,21	0,324

As for the Tamentit soil, the El Menea plot, the difference between the rate of organic matter in the surface and subsurface horizon is the result of a contribution of organic amendment brings to the surface horizon which has not deteriorated in order to migrate towards the subsurface horizon. The soil is very poor in total nitrogen in the surface and subsurface horizon with 0.50% 0.4% and 0.39%, very poorly provided with assimilable phosphorus in the surface horizons and of subsurface with grades between 0.44 and 0.64pbm, in contrast to the assimilable potassium of which it is moderately rich in the surface and subsurface horizon with grades of 0.20 and 0.27meq/100g. The total nitrogen content of the surface and subsurface horizon is 0.4%, indicating that the soil is very poor, but since the texture is sandy, nitrogen is not retained, is evaporated or entrained towards the depth. The levels of available phosphorus and potassium are low, 0.54 and 0.59pbm for phosphorus and 0.17meq/100g for potassium; this is the result of the soil nature of the (sandy) region.

The climate

The climate of the Adrar region follows the general characteristics of the Saharan climate with a cold winter sometimes reaching 0 °C (December-January), while in summer the temperature exceeds 45 °C (July-August). Rainfall is extremely low if not insignificant (Table 2). The frequency of the winds is great throughout the year, generally in the spring (March-April) the sand winds 71.58km/h. The temperature reaches 49.9 °C in July. Almost all the water needs of the region are met by underground water tables. The most extensive aquifer, that of the intercalary continental, occupies an approximate surface of 600 000 km^2; the volume of water that is kept underground in the subsoil is equivalent to 60000 billion m^3, i.e. a capacity of 2000 m^3/s for a period of 1000 years (DSA: Direction of Agricultural Services of Adrar). Water has been exploited for centuries in the region using a traditional system: the foggaras.

Table 2: Climate data for 2012 in Adrar (metéorologique Station INRAA, Adrar).

Mois	The Average Temperatures in °C	Sum of Rainfall (mm)	Wind (km/h)
Avril	27,3	0	71 ,58
Mai	37,1	0	53,68
Juin	46,1	0	54,25
Juillet	49,9	0	58,671
Août	47,2	0	55,38
Septembre	44,4	0	57,43

Sampling

Sampling for forage analyzes and measurement of biometric parameters was conducted in the second and third cycles on the same alfalfa crop. For this purpose, we have delineated four micro-parcels of one square meter at different stages of the lucerne (floral buds: BF and beginning flowering: DF) at the studied stages. One of the micro-plots was used to determine the leaf to stem ratio. The other three micro-plots were subjected to measurements of the biometric parameters and yield rating after mowing. The biometric parameters studied were yield components related to variation in forage chemical composition, i.e, number of plants per square meter, number of stems per square meter, dry and green leaf to stems, length of stems, and yield in green and dry. The average rainfall during the experimental period is 0mm.

Result and Discussion

The percentage of germination was 54% for the seed type Tamentit and 82% for the seed type El Menea (Table 3). However, we must not forget that where the part of the species *Medicago sativa* dominates compared to M falcata, the germination of alfalfa is done very badly in the presence of excess sodium. However, according to

[10], by his geographical origin, *M. sativa* is better adapted to these ecological conditions; this choice can evidently lead to a lower resistance to cold. For this reason, sowing is done under cover of a nurse crop that is barley. Similarly, the trial suffered from grass competition, followed by a sudden change in microclimate at the harvest of barley, particularly excessive sunlight. The harvest is lost in the first year. We observed on the ground a heterogeneous emergence in tufts, leaving numerous voids which cannot be filled in the following years; these observations are confirmed by [11].

Table 3: Germination results of the two varieties Tamentit and El Ménea.

Cultivars	Date of Sowing	Date of Germination	% of Germination
Tamentit	14/10/2011	19/10/2011	54%
El Menea	14/10/2011	10/10/2011	82%

However, in the Saharan regions, alfalfa is the main fodder crop. Farmers in the region have shaped populations that are able to match and sometimes exceed the introduced varieties for certain traits [12]. From the results of Table 3, under the climatic conditions of Adrar the germination of El Menea is faster than Tamentit. Barley suffers from both competition with alfalfa and weeds because there is currently no chemical treatment capable of destroying the main weeds while respecting alfalfa and cereals. For this reason, weeding is carried out by hand. The evolution of the mean height of the stems of the populations in the pedoclimatic conditions of Adrar in 146 days after sowing shows that the El Menea population is higher than 9.1cm (Table 4). Of the number of green leaves in both populations shows that Tamentit is more leafy on stems shorter than the EL Menea population, respectively an average number in 146 days after sowing of 74.9 and 69.94 (Table 5).

Table 4: Average stem height of populations.

Number of Days After Sowing	Height of the Stem of the Stem in cm	Height of the Stems of El Menea in cm
56	5,3	7,7
66	6,3	8,5
76	9,4	9,5
86	12,	14,8
96	14,6	15,2
106	18,4	24,4
116	33,4	33,8
126	39,4	34,4
136	49,4	45
146	42,8	46,8
Average	23,1	24,01

Table 5: Period of flower formation.

Number of days after Seeding	Number of Leaves Tamentit	Number of Leaves El Ménea
56	18,6	16
66	19,8	18,6
76	38,8	34,8
86	37,8	51,8
96	41,4	46,8
106	42,6	52,6
116	96,2	83,2
126	141,8	103
136	188,0	122,6
146	124	135,4
Average	74,9	69,94

According to [11], a long day regime causes a faster elongation of the leaves but, on the other hand, the extension in width is reduced. Indeed, we have noticed in our research in the North very different forms of a same variety according to the season. Concerning the rods for a same period, the rate of realization of elongation potential depends on the water stress which plays as a blocking element of the elongation (Kid., ND).

According to the date of sowing and the date of appearance of the first flowers we can tell the Tamentit population is early compared to El Menea. Also, this same population gives more flowers 74 against 40 in El Menea. However, the gap in the full flowering cycle is shortened to one day, on 4/04/2012 and 5/04/2012 respectively at Tamentit and El Menea (Table 6), [13] in a trial in southern Sardinia, the cultivar Tamentit considered being the earliest, thus showing a different precocity depending on the location of the trial. The earliest cultivars in irrigated conditions flower 3 to 7 days earlier than in rainfed conditions, while the later cultivars retard their flowering from 10 to 21 days when they are carried in rainfed conditions. According to the results obtained in the second year of exploitation of the El Menea population (Table 7) in the floral button stage, the number of plants per square meter varies from 16 to 26 plants/m^2. The number of stems per square meter varies between 739 and 855 stems/m^2. With a higher number of stems when the number of plants records 21 instead of 26 plants. This same number of plants offers a higher mean height of stems than the two other densities, i.e. 32.62cm (Table 7).

Table 6: Period of flower formation.

Populations/Parametres	Flowering start date	Number of plants that have flowered	Number of flowers that have flowered	Date of full bloom
Tamentit	18/03/2012	42	74	4/4/2012
El Ménea	22/08/2012	13	40	5/4/2012

Table 7: First section of the El Ménea population at the floral button stage.

Number of Micro-parcels	Date of Harvest	Number of Plants/m^2	Number of Stem/m^2	Height of the Stems	GM g/m^2	DMg/m^2	Rapport L/S in Green	Report L/S in Dry
EM1	11/9/2012	16	739	29,41	815	99,11	1,072	1,407
EM2		26	789	26,76	830	95,01	1,103	1,61
EM3		21	855	32,62	960	120,41		
Average		21	794,33	29,6	868,33	104,84	1,09	1,51
Standard deviation		5	58,18	2,93	79,74	13,64	0,022	0,144
(EM: El Ménea , GM: Green Matter, DM: Dry Matter, L/S report leaves on stems)								

The yield from plants per square meter of 21 is higher, i.e. 960g/m^2 of green and 120g/m^2 of dry matter (Table 7). The ratio of leaves to stems is greater than 1; plants are leafy, which is favored by the rise of temperature and irrigation. Indeed, according to Plancquaert (ND) high temperatures promote the growth of the stems of alfalfa which can be continuous until flowering. On the other hand, the leaf area (or the quantity of leaves) becomes maximum from a certain time.

Thus, when the sum of the temperatures is low, the growth of the stem does not reach the maximum, the proportion of leaves is relatively greater and the F/T ratio is higher. In the third year of operation, which coincides with the spring season (Table 8), the average number of stems is 221.33 lower than that of the first cut 794.33, and the average height is 43.93cm higher than the mean first cut 29.6cm. Therefore, the summer season and the second year of operation encourage the increase of the stem and the spring season favors the height of the stems. The green and dry production is higher in the second cut respectively 868.33g/m^2 GM, 104.84g/m^2 DM compared to the first cut. Therefore, in this arid region the productive season of the alfalfa is the same as in the dry season, to the north is the spring.

Table 8: Second section of the population El Ménea at the floral button stage.

Number of Micro-Parcels	Date of Harvest	Number of Stem/m²	Height of the Stems	GM g/m²	DMg/m²
EM1	Avril /2013	162	39	845	150
EM2		170	45,5	800	120
EM3		332	47,29	1435	185
Average		221,33	43,93	1026,67	151,67
Standard deviation		95,92	4,36	354,34	32,53
(EM: El Menea, GM: Green Matter, DM: Dry Matter)					

Some local populations may give 12 cuts. Indeed, according to [14], Aoulef distinguishes itself and produces 12 cuts; Ghardaïa and Magali 2355 occupy the 2nd position with 11 cuts; El Menea is in third place with 10 cuts. We note that three local populations are ranked among the best; this result confirms those of [8]. All other populations and varieties have a number of cuts per year of less than 7.59. However, at El Menea in Adrar according to [15] advances the figure of 8 cuts per year which is different from the result of [14]. Compared with the floral button stage, the number of plants and stems per square meter at the beginning of flowering stage does not change during the first cut of the second year of operation. On the other hand, the height of the average stems increases by 12,1cm. The green and dry yield increased by 380g/m² and 74.85g/m², respectively.

The leaf to stem ratio decreased slightly from 1.09 to 0.98 in green and 1.51 to 1.04 in dry. Compared to the ratio obtained at this early stage of flowering on Tamacine by [16] in the Ouargla region (2005), 0.92 in green and 0.97 in dry, our results are higher. Thus, in the Adrar region under the effect of summer temperatures, plants are more leafy in the floral bud stage. According to [5] studies on North African varieties, of temperature oscillates between 600 °C and 800 °C for the production of a shoot in irrigated culture, from the cut to the beginning of the following flowering. In Morocco, this sum of temperature is reached in 25-40 days, so you can count on mowing every 25-40 days, provided you grow a variety that does not require or almost no winter rest. This is the case of our populations; the winter period goes unnoticed maximum fifteen days. Almost every day a mowing is carried out according to [15]. In spring, with the second cut the number of stems per square meter decreases from 681.67 stems by m² to 248.67 stems by m². The height of the stems reaches a maximum of 55.33cm (Table 9). In the Ouargla region and on the Tamacine population, the height of the stems at the floral button stage reached 57.46cm [16].

Table 9: First section of the El Menea population at the beginning of flowering stage.

N°	Date of Harvest	Number of Plants/m²	Number of stem/m²	Height of the Stems	GM g/m²	DM g/m²	Report L/S in Green	Report L/S in Dry
EM1	12/9/2012	19	488	43,18	970	146,83	1,051	1,125
EM2		26	753	46,8	1290	190	0,913	0,964
EM3		21	804	44,17	1485	202,24		
Average		22,00	681,67	44,72	1248,33	179,69	0,98	1,04
Standard deviation		3,86	169,65	1,87	260,02	29,11	0,10	0,11

The difference between the green and dry yields of the two El Menea cuts is not significant. It is 8.64g/m² of dry matter. At this stage, the influence of the season is negligible. With the same seedling rate as El Menea, the Tamentit population has an average of plants per square meter below, i.e. 15.75 at the floral bud stage, as well as lower values of the other two parameters, height of stems and number of stems per square meter (Table 10). Square meters (Tables 7&11). Evidently the yield follows the same logic, the quantity of green matter in g/m² and dryness of Tamentit is less than that of El Menea. From the floral button stage to the early flowering stage, the yield decreases in the Tamentit population and this is lower than that of the El Menea population. However, the green and dry ratio at the two studied stages of Tamentit is higher than that of El Menea (Tables 11&12). This last parameter gives better digestibility of Tamentit.

The first cut of the two Oasiens cultivars carried out on 09/2012 and the second cut, on 04/2013 at El Menea, their residual dry matter (DM) rates range between 91% and 93%, which is not far from values found in alfalfa analyzed immediately after mowing. This shows that the samples were well preserved during the 4 years. The quantity of mineral matter (MM) is high in the El Menea population (Table 11), which decreases from the BF stage to the DF stage. Same findings in the population Tamentit but this one offers lower levels than those of El Menea. This is explained by the quality of the soil where these are carried out, already indicated

in the material part and methods. In the El Menea population, the level of nitrogenous matter (CP) is high in the floral bud stage (BF) and decreases in the early flowering stage (DF), in both mowings; but the first mowing exceeds the second mowing by 14.32 points at the BF stage and by 9.39 points at the DF stage. By contrast with the Tamentit population, the MAT level is high at the DF stage of 2.49 points compared to the stage LF. This value exceeds the El Menea population at the BF stage of the first cut by about one point (Table 11).

Table 10: Second section of the El Menea population at the beginning of flowering stage.

N°	Date of Harvest	Number of stem/m²	Height of the Stems	GMg/m²	DMg/m²
EM1	Avril -2013	218	38,5	1300	220
EM2		221	55,33	1300	185
EM3		307	46,67	1100	160
Average		248,67	46,83	1233,33	188,33
Standard deviation		50,54	8,42	115,47	30,14

Table 11: The chemical composition of the two oasis cultivars and the two stages studied.

Samplings	DM en%	MM%DM	CP%DM	OM%DM	CF%DM
El Menea BF first cut	91,49	12,95	38,71	78,54	11,13
	91,70	13,76	36,49	77,94	13,39
	95,17	13,01	33,91	82,16	14,36
Average	92,78±1,19	13,24±0,26	36,37±1,37	79,55±1,32	12,96±0,96
El Menea DF first cut	91,83	13,03	31,16	78,80	16,86
	91,90	13,74	27,82	78,16	17,67
	91,75	12,16	33,52	79,58	12,83
Average	91,83±0,04	12,98±0,46	30,83±1,65	78,85±0,41	15,78±1,50
El Menea BF second cut	92,86	14,72	20,78	78,14	21,77
	92,70	14,24	23,31	78,47	13,67
	93,52	18,63	22,04	74,90	22,99
Average	93,03±0,25	15,86±1,39	22,05±0,73	77,17±1,14	19,48±2,93
El Menea DF second cut	93,14	14,23	22,51	78,90	21,72
	93,39	14,81	20,94	78,58	23,21
	92,87	15,32	20,85	77,55	25,86
Average	93,13±0,15	14,78±0,32	21,44±0,54	78,35±0,41	23,60±1,21
Tamentit BF first cut	91,89	11,60	35,12	80,28	12,20
	92,34	11,86	35,37	80,48	12,56
	92,23	12,35	34,38	79,89	12,72
Average	92,15±0,14	11,94±0,22	34,96±0,58	80,22±0,17	12,50±0,15
Tamentit DF first cut	91,99	11,24	37,19	80,75	11,25
	92,11	11,38	37,26	80,73	11,13
	92,37	11,74	37,89	80,63	11,48
Average	92,16±0,11	11,45±0,15	37,45±0,37	80,70±0,04	11,28±0,11
Residuel dry matter (MS), mineral matter (MM), floral button (BF), beginning of flowering (DF). CP:crud protein, CF: crud fiber					

Table 12: The average chemical parameters of the two cultivars and of the two stages combined.

Samplings	Average	Standard deviation	Minimum	Maximum	Number of value
DM%	92,51	0,211	91,49	95,17	18
MM%DS	13,38	0,43	11,24	18,63	18
CP%DS	28,58	1,33	20 ,78	38,71	18
CF%DS	15,93	1,17	11,12	25,86	18

Since mineral matter is high in El Menea, the level of organic matter is higher in Tamentit (Table 11). The average of the chemical values of the two cultivars, of the two stages combined, is 28.58% total nitrogenous matter and slightly more than half the fibers, i.e. 15.93% crude fiber. The highest standard deviation is 1.33 (Table 12) is also found in MAT. The highest value of this parameter is 38.71% registered at El Menea at the flower bud stage and the lowest value is 20.78% recorded in the same cultivar at the same stage but at the second mowing (Figure 1a). Since the correlation coefficient (Table 13) shows that the two chemical elements CP and CF are inversely proportional, the choice of mowing stage will depend on the cultivar.

Table 13: Correlation matrix of the chemical parameters of the Oasiens cultivars El Menea and Tamentit.

	MS%	MM%MS	MAT%MS	CB%MS
MS%	1			
MM%MS	0,444*	1		
MAT%MS	-0,405*	-0,634***	1	
CB%MS	0,458*	0,813***	-0,811***	1
DDL=18-2=16. Pour α=0, 1rt=0, 400. α=0,05rt=0,468. α=0,0rt=0,590. *Significative, ***Trèshautement significative				

Table 14: Analysis of the variance of the chemical parameters of the two cultivars Oasien El Ménea and Tamentit and of the two stages combined floral button and beginning flowering.

Paramètres	Variance	DDL	Chi2	P
DM%	0,80	17	13,61	0,610
MM%DM	3,33	17	56,64	<0,0001
MAT%DM	31,91	17	542,400	<0,0001
CF%DM	24,72	17	420,316	<0,0001

The average mineral content was 13.38% in the two cultivars, the mean of the two stages (Table 12). The maximum is 18.63% in El Menea at the floral bud stage and at the second mowing, higher than the first mowing. The minimum is 11.24% in the cultivar Tamentit at the beginning stage of flowering, which is lower than the floral bud stage (Table 12). For this chemical element, assimilation depends on the cultivar, the stage of the plant and of the number of the mowing, that is to say of the age of the latter. Indeed, the older the plant, the greater the assimilation of mineral matter (Figure 1b), but the need for the floral bud stage is higher than at the early bloom stage. Thus, it can be deduced that in alfalfa, at both stages studied, the synthesis of nitrogenous materials is inversely proportional to the synthesis of fibers (CB), and the number [17,18] of mowing influences the chemical composition of the plant.

Analysis of variance of chemical parameters shows a very highly significant difference $p<0.001$ except for dry matter where there is no significance (Table 14). The average mineral content was 13.38% in the two cultivars, the mean of the two stages (Table 12). The maximum is 18.63% in El Menea at the floral bud stage and at the second mowing, higher than the first mowing. The minimum is 11.24% in the cultivar Tamentit at the beginning stage of flowering, which is lower than the floral bud stage (Table 12). For this chemical element, assimilation depends on the cultivar, the stage of the plant and of the number of the mowing, that is to say of the age of the latter. Indeed, the older the plant, the greater the assimilation of mineral matter (Figure 1c), but the need for the floral bud stage is higher than at the early bloom stage. The Kaiser criterion leads us to retain a single axis for the analysis of the principal components (ACP). In the criterion of the elbow, there is a significant drop from the first axis (from 77.08% to 12.5% of the inertia). In the first plane, all the parameters are close to the circle and are therefore well correlated with the two factors constituting this plane (F1 and F2). The factorial projection (1,2) gives 89, 58% of information. The two organic chemical elements (OM %) and total nitrogenous matter (CP% DM) explain the number one swaths, of the two stages, of the two cultivars, El Menea and Tamentit. On the other hand, dry matter chemicals (DM), ash (MM% DM) and crude fiber (CF% DM) explain the second mowing group of the cultivar El Menea (Figure 2).

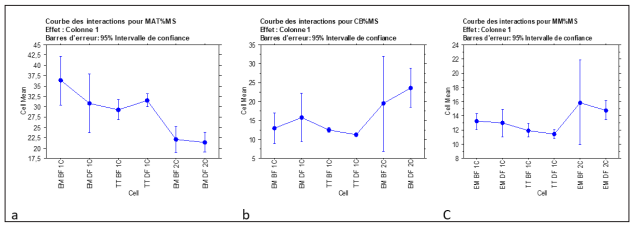

Figure 1: a, b and c. Interactions, cutting stage (BF, DF), section number and chemical composition CP, CF and MM of two Oasiens cultivars El Menea (EM) and Tamentit (TT).

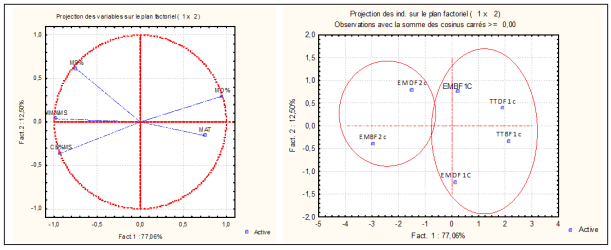

Figure 2: ACP of the chemical parameters of the Oasiens cultivars El Menea and Tamentit.

Conclusion

So, with good control of alfalfa management the association forage and breeding are possible in the oases. The texture of the soil intervenes in the reasoning of the fertilization. In sandy soils, there is a high risk of leaching nutrients from fertilizers because of their high permeability and low exchange capacity. However, organic matter plays a very important role on soil formation and evolution. It improves its chemical properties (gradual release of nutrients useful to the plant). So, in these soils fertilizer inputs have to be fractionated during the vegetative cycle of the crops. But it is difficult to predict quantitatively and over time that it will be the release of nutrients as a result of organic fertilization. For this reason, mineral fertilizers make the difference necessary to ensure the growth of yields. Hence the affirmation of the indisputable superiority of the association of breeding to agriculture for the maintenance of soil fertility.

Moreover, organic manure is used in most palm groves. Comparison of the results of the two oasis cultivars shows a superior, rapid and early germination of El Menea to that of Tamentit. The population of El Menea is higher than Tamentit. The summer season and the second year of operation promote the increase of the stem and the spring season favors the height of the stems. From the budding stage to the early flowering stage the height of the stems increases as well as the production in green and dry. The difference between the green and dry yields of the two cuts on El Menea is not significant.

In this arid region the productive season of alfalfa is the same as in the north; it's spring. These local populations can yield 8 to 9 cuts per year. Practically every 45 days a mowing is carried out. For the chemical composition, the mineral matter is high in El Menea; the level of organic matter is therefore higher in Tamentit. In the El Menea population, the level of CP is high in the floral bud stage (BF) and decreases in the early flowering stage (DF), in the two mowers; but the first mowing exceeded the second mowing by 14.3 points at the BF stage and by 9.39 points at the DF stage. On the other hand, in the population Tamentit the level of CP is high in the DF stage of 2.49 points compared to the stage BF. This can be explained by the sampling conditions of the population. On the same board the two stages are mown the same day since at the bottom of the site the little irrigated population reaches the early flowering stage while it is at the stage floral button at the entrance of the site. Thus, irrigation conditions the duration of the cycle.

The rate of nitrogenous matter decreases from one physiological stage to another and from one cut to another under normal conditions. But any stress can cause a chronological upheaval in case of water stress in the population Tamentit which has caused modifications of certain biometric parameters. However, the synthesis of the nitrogenous materials is inversely proportional to the synthesis of the fibers (CF), and the number of mowing influences the chemical composition of the plant. The more alfalfa is older, the greater the assimilation of mineral matter, the higher the need for the floral bud stage is higher than at the early bloom stage. Analysis of variance of chemical parameters shows a very highly significant difference $p<0.001$ except for dry matter where no significance. The CPA forms two homogeneous groups. As a result, in this oasis, the population of alfalfa El Menea is more productive than the Tamentit population which has better digestibility.

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