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The effects of fodder mowing on the productivity of the silting pasturage in Burkina Faso

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ABSTRACT

The study of mowing effects on the dynamic of the pasturage has led to the realization on a helpful stool in order to schedule the exploitation of the fodder. The applied experimental device is a bloc of an effective three times yield in some parcels which is measured 3m x 5m. Four treatments have been applied: (i) an improved exploitation with NPK + urea, (ii) an improved exploitation with Burkina Phosphate, (iii) a simple exploitation and (iv) a case without any exploitation. The device started at the beginning of the rainy season of the experimental year, 2002, as its first time of experimentation. The exploitation takes place every year at the end of August to the beginning of September in which period the vegetation is nature. The results of seven years of experimentation reveal that the exploitation provokes the damage of pasturages. This damage is manifested by the loss of the floristic biodiversity for a rate of 50% concerning different species. Legumineae are more resistant than gramineae concerning the mowing. The pasturage risks are more important from the third year. The application of chemical fertilizers increases the production of fodder and reduces the damage speed of soils. The contribution of fertilizers is theoretically profitable. This study suggests that after three stop less years of exploitation, a necessary time of rest shall be observed for fodders. The study suggests that some regular studies must be done with others parameters (biology of soil, degree of infiltration, etc…) in order to appreciate well the impacts of this kind of exploitation.

Key words: fodder, NPK, Burkina phosphate, urea, mowing.

INTRODUCTION

In sahelian area of Burkina Faso, the vegetation unities linked to the silting representes a very important pastoral unity by its extension (16,9%, its pastoral value 60%) and its high productivity (on average 2 tonnes of DM/ha/year) and comes on the second position after the lower unities of bottoms and depression [8, 9, 13]. This unity is highly exploited in agriculture [5] but the non cultivated zones constitute some unities of pasturage which are fluently exploited by the pasturage and the mowing. Generally, mown gramineae is made up of shrub traws (*Aristida adscensionis, Schoenefeldia gracilis Cenchrus biflorus*) and especially of legumineae (*Zornia glochidiata, Alysicarpus ovalifolius*) which is sold in its great part in the cities of the area [2, 16, 17]. The sale of the fodder procures some substantial incomes for the producers that have some less resource. Also the mown grass constitutes a source of a complementary food for breeders especially in the domain of fattening and the production of milk. Out of consideration, the growing phenomenon of this form of exploitation and the support that it benefits from the services of development through the broadcasting of methods and techniques, the search of methods for a durable management in these domains becomes necessary. The proposal of this experimentation is to verify the effects of mowing on the productivity of pasturages in order to contribute to their durable management. Supposing that the mowing should take place every year at the end of the rainy season when the production of phytomasse is optimal to

be exported, the productivity will be feeble at a certain time. Some authors [4, 11] have already mentioned the risks concerning the different measures of management (above all pasture) about the nitrogen value and the increase of these pasturage unities damaged by waters coming from rains.

MATERIALS AND METHODS

Study site

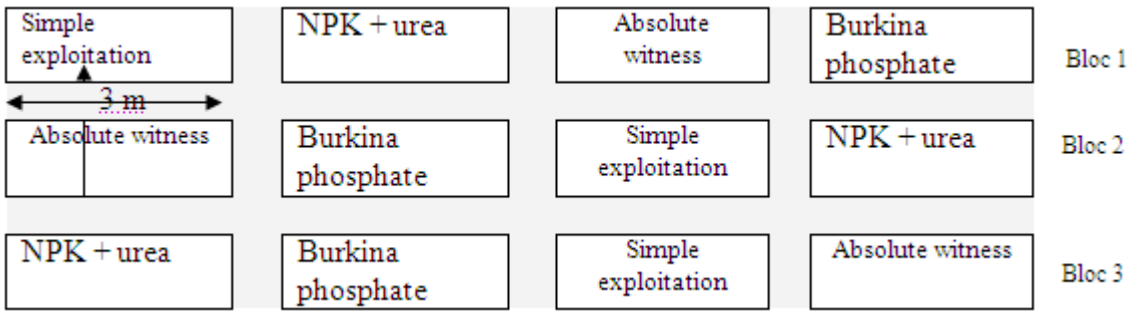
The study has been realized in the research station of Katchari on the site of latitude 14°02' 49, 1''North and of longitude 00°08' 02,4' west. The vegetation is constituted by thorny steppes. According to Kiema and Sanon, [12] three great types about unities in glacis (52,84%) of silting (39,70%) shallows and depressions (7,84%). The siltings which are the object of this study are essentially constituted of grounds of culture. The main cultivated specie is the *Pennisetum typhoïdes* which yields are over two (2) tons per hectare. The ligneous strate is very clear, mainly with *Ziziphus mauritiana, Balanites aegyptiaca, Faidherbia albida, Acacia raddiana, Guiera senegalensis, Bauhinia rufescens, Hyphaene thebaïca* [2], etc. The strate of grass fallows which are reduced into small islands in the highly exploited parcels at the end of the raining season by mowing for the haymaking. These formations are very pastured in dry season where they offer some residues of abundant harvest in post-harvest period. The capacity of annual charge is of order of 4 ha/UBT/year. They constitute of excellent pasturages with a pastoral value of order of 55 to 60%. The soil physical properties of this unity are essentially characterized by a sandy structure. The chemical composition is characterized by the rate of organic matter nitrogen which is very low (respectively 0, 36% and 0, 01%) and of lower potassium (585 mg/kg of DM) the PH water is feebly-acid (6, 28). The biologic activity is increased at rainy seasons. (33,07 mg/100g of soil). The main problem of this unity is the eolian erosion and hydraulic erosion in rivulet [14], this author proposes the improvement of fertilizers actions and the anti-erosive adjustment.

Experimental device

Device of parcel

This study has been realized in pasturage where the soil is sandy: *Zornia glochidiata, Alysicarpus ovalifolius, and Schoenefeldia gracilis* at the research station of Katchari. The proposed experimental device is a bloc which is completely yielded with three repetitions (Fig. 1). The size of the parcels is 3m X 5m. Four treatments have been applied: (i) an improved exploitation with NPK (Nitrogen (14), phosphor (23) and potassium (14) + urea (46%) respectively at a rate of 400 kg/ha/year; (ii) an improved exploitation with Burkina phosphate (BP) for a dose of 400 kg/ha/year; (iii) a simple exploitation without the contribution of fertilizers (TS) and (iv) the absolute witness, that is to say the case without exploitation (Tabs). The application of the fertilizers has been done every year. The application of the device starts at the beginning of the rainy season. All the parcels are mown every year at the end of August to the beginning of September when the vegetation state is at the most except for the witness parcels (Tabs). The phytomasses produced in the parcels with the others treatments have been mown and exported. For the Tabs, the mowing has been followed by an integral restitution. In the parcels, the parameters followed have been concerning the phenology of species, the phytomasse produced, the floristic composition, the bromatologique value of the fodder and the chemical composition of the soil.

Fig. 1: Experimental plots of mowing



Pluviometry

The pluviometry readings have been taken immediately after every time of rain by a direct reading pluviometer. The device of pluviometry readings is located about 300 m from the experimentation site.

Reading of the vegetation

Phenology

On the site, the phenology of existed species has been determined to identify the periods of upstream; flowering, fruition and the withering time in the main species for every period. Three stades have been determined; the beginning, the middle and the end.

Recovering and floristic composition

The floristic composition species have been determined from the method of points-quadrats lined in every parcel at the rate of two transects for each of time. The recovering is deducted from the naked soils coming from the measures of the points-quadrats [6].

Phytomasse

The phytomasse has been assessed by integral cut off in the elementary parcels at a mid fruition state. The mown gramineae has been weighed when it was fresh, then a sample of 200 g per parcel has been conditioned for the determination of the dry matter which has a regular weight in the stove at 65^0c. Some samples have been analyzed as a next step for the determination of bromatologique value of the fodders taken per category (gramineae, legumineae in 2005 after 4 year of reading).

Soils and fodder nutriments

The nutritive elements have been obtained by the analyses of the soil samples and the fodder taken in 2005. The samples of soils have been taken in the horizon 0-20 cm. In every parcel, some samples of soils have been taken from two different locations to constitute a composite sample. After, the samples have been dried up in the shade silted at 2 mm. The tenor of carbon has been dosed according to the method proposed by Walkley and Black [18]. The organic Nitrogen has been dosed according to the modified method of Kjeldahl. The results have been expressed in g C/Kg dry soil and g N/Kg dry soil. The phosphor has been dosed by specbrophotometry according to Bray and Kurtz [3], and the results expressed in mg P/Kg dry soil.

The fodders have been taken in the same parcels during the evaluation of the phytomasse while separating the gramineae from the legumineae. The analyses had concerned the dry matters (DM); the cinders (CM) crude celluloses (CB) and total nitrogen (NT) for the legumineae.

The estimation of the production costs

The production of fodder in the parcels has been evaluated while taking into account the costs of the fertilizers on the markets. The opportunities of labor costs, of transport, of mowing and of conditioning the fodder in village as well as the price of fodder sale in town (Dori). The charge of fodder exploitation has been evaluated for 10 FCFA/Kg of MS, the conditioning for 5 FCFA/Kg and the transport for 1,5 FCFA/Kg of MS on the basis of data gotten by the investigation in the village of Katchari. The clear margin of production has been reduced in these different charges, the average prices of the sale of fodder evaluated for 66 FCFA/Kg at dry season (optimal period of fodder sale) [2] and the production of the local phytomasses evaluated at the end of August.

Statistic analyses

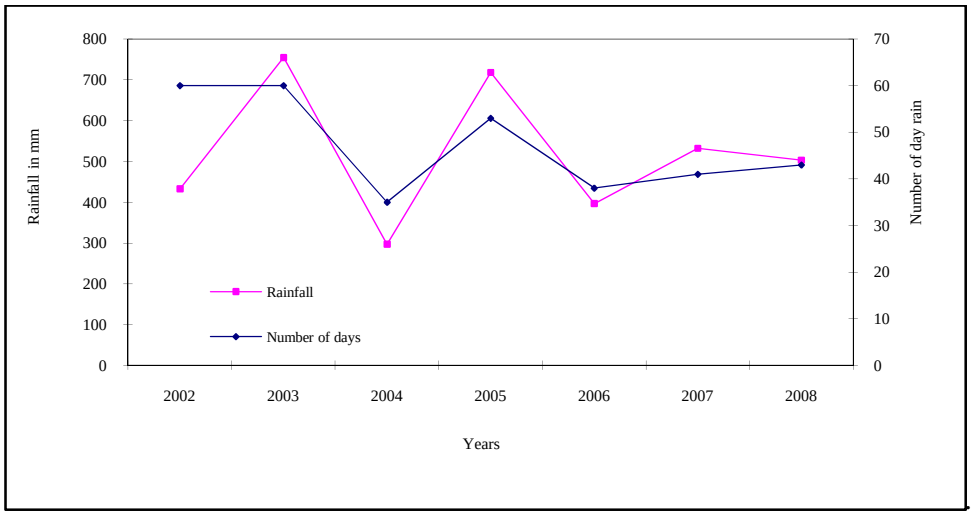
The results have been submitted to a variant analysis (ANOVA) with a classification criterion in order to test the mowing effects and fertilizers on the dynamic of the vegetation. The test of Scheffe [15] has been used to identify averages which differ signicantly from the threshold of 5%.

RESULTS

Pluviometry

During the experimentation period, the pluviometry has been characterized by a year of deficit in 2004, (297 mm for 38 days), 2008 (503 mm for 43 days) and two other excesses in 2003 (with 755 mm for 60 days) and in 2005 (with 718 mm for 53 days) giving an excess average of (519± 167 mm for 47±10 days) comparing with the average on the zone which is located between 300 to 400 mm. Except in 2003, for all the years, the month of July has been the most rainy with 30 to 35% of the total of rain fall. On average, the total of the months of July and august has represented 52% to 65% of the year rain fall (Fig.2).

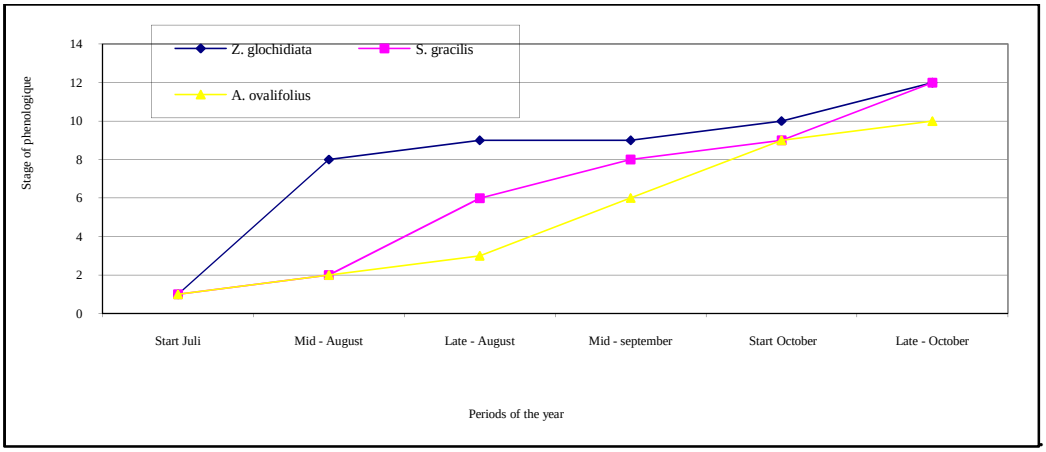
Fig. 2: Dynamics of the rainfall to the reference site



Phenology

The phenology of the main species for mowing has been observed (Fig. 3). There is a great variation in their maturation time limit. There is more than one month of precociousness between *Zornia glochidiata* and the species *Schoenefeldia gracilis* and *Alysicarpus ovalifolius*. The exploitation at the end august shows that it is in broad flowering and growth.

Fig. 3: Phenogram of the three main species of the site (2): stage of the growth 4: start flowering, 6: full bloom, 8: medium fructification, 10: start drying, 12: medium drying



Floristic characteristic

The effects of treatments on the dynamic of the vegetation have been annually observed. After seven years of exploitation, the floristic composition is characterized by a significant difference of presence concerning some species between parcels which receive the fertilizer NPK + urea (17 species), the absolute witness (16 species) and the simple parcel which is mown continually. This floristic composition is dominated by the species (*Zornia glochidiata* (30,5 to 37*%), Schoenefeldia gracilis* (29,1 to 33,2%), *Alysicarpus ovalifolius*, etc.

Whatever the treatment, it has been observed that *Zornia glochidiata* increases with the age of exploitation whereas *Schoenefeldia* decreases. The increases of *Zornia glochidiata* is significantly more important in the parcel treated with Burkina phosphor and the simple mowing (70%). Parallel to this evolution, others species were developing as *Brachiaria distichophylla and Dactyloctenium* in the parcels of these last two treatments. Moreover, the presence of specie *Alysicarpus ovalifolius* was depreciating from the third year in all the parcels. The specific contribution of *Zornia glochidiata* begins a brutal decrease from the second year in the parcels which have been treated with BP and the witness which is compensated by an increase of *Schoenefeldia*. In the treated parcels with NPK + urea, reduction is differed for one year. In the parcel with simple mowing, the contributions of *Zornia* and of *Schoenefeldia / Aristida* are maintained up to the third year before it follows the same evolutionary processes of the others.

The dynamic of the production is manifested by the decrease of the gramineae in all the exploited parcels. This decrease is more important in the seventh year in the parcel with simple exploitation and with Burkina phosphate (Fig. 4). The specific contributions of gramineae in the parcels treated with NPK + urea and mown with restitution vary between 25 and 30%. Many other species more develop in these last two parcels comparing to the others. As a general remark, the treatments associated to the pluviometry have had some effects on the dynamic of floristic composition which is characterized by a fodder enrichment of parcels receiving some fertilizers or some organic.

Fig. 4: Variation of the specific contributions of the types of fodder

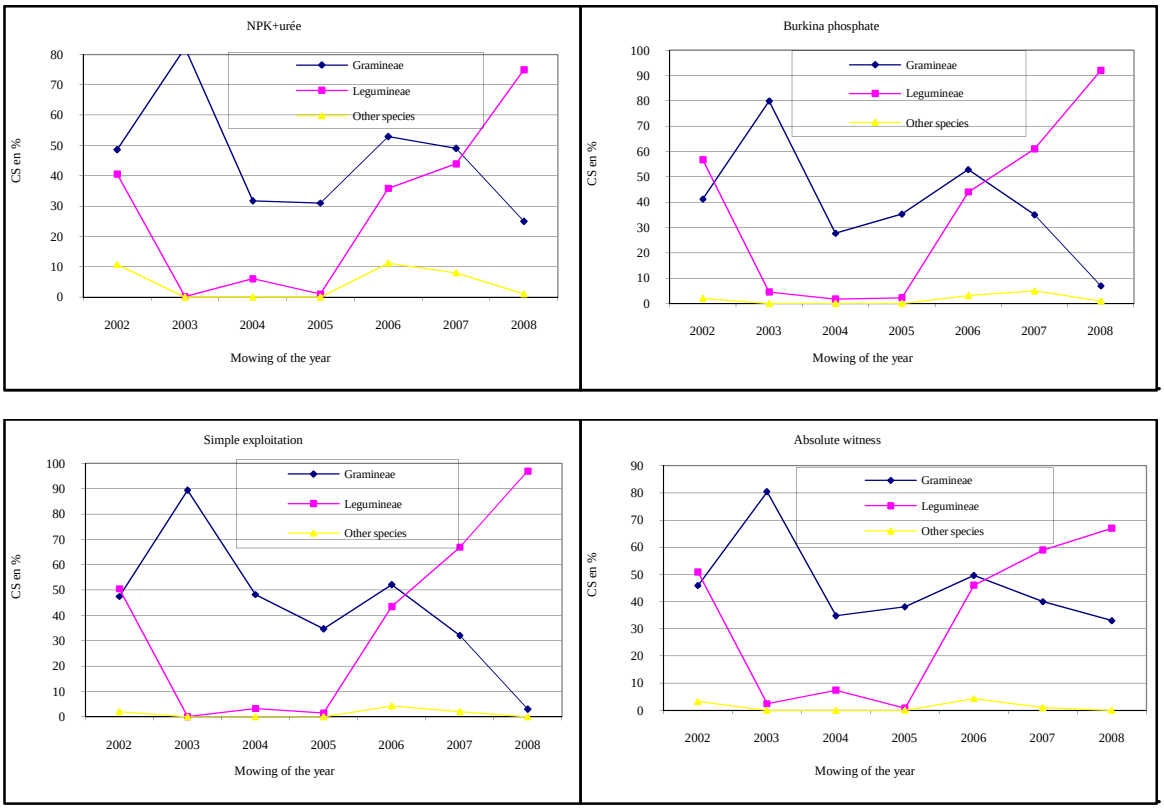
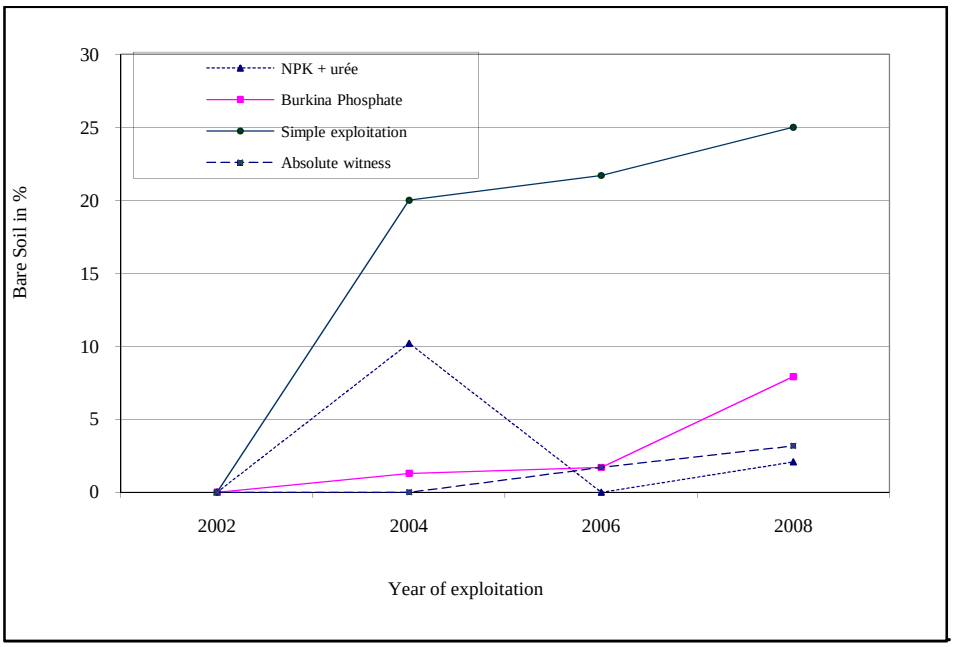


Fig. 5: Impact of mowing on the recovery of soil degradation



Recovering

Recovering has been variable between 2002 and 2008 depending on the treatments. The results are revealed from the initial state in 2002 (0% of naked soil in all the parcels), the damage has been more important in the parcels which are exploited without fertilizers (about 20 to 25% of naked soil) in comparison with the absolute witness (0 to 3,2% of naked soil). The damage begins early on the soils of parcels that are exploited without restitution from the second year of exploitation. Those treated with BP (1,3 to 7,9% of naked soil) and with NPK + urea (2,1 to 10,2% of naked soil) have shown the lower level of damage concerning the soil recovering (Fig. 5).

Phytomasse

The treatment effects on the production are indicated in the Fig. 6, 7 and 8 relative to the gramineae, the legumineae and all the productions. On average concerning the period of observation, the fact of using fertilizers has given significantly an increase of the fodder production in comparison with other treatments at threshold of 5%. Nevertheless, there are no differences between the parcels treated with Burkina phosphate and those mown with restitution that are different from the parcels simply mown. Taking the gramineae fraction into consideration, the difference is significant between the parcels treated with NPK and all the others that are not different. In all the parcels, the legumineae have realized an increase more than 30% in comparison with the initial production. This result is linked to *Zornia glochidiata* which resists more to mowing than the other species because of its creepy port. However, this increase is more important in the parcels simply mown and treated with Burkina phosphate with more than 80% of biomass with vegetable in seventh year against respectively 54,4% and 61% for the parcels treated with NPK and absolute witness. The seven annual impact of exploitation has been less depressive in the fertilized parcels than those which are simply exploited. The utilization of the phosphate fertilizer and the simple exploitation has significantly stimulated ($p<5\%$) the production of the legumineae in comparison with the other treatment.

Fig. 6: Effect of mowing on the dynamics of the production of fodder gramineae

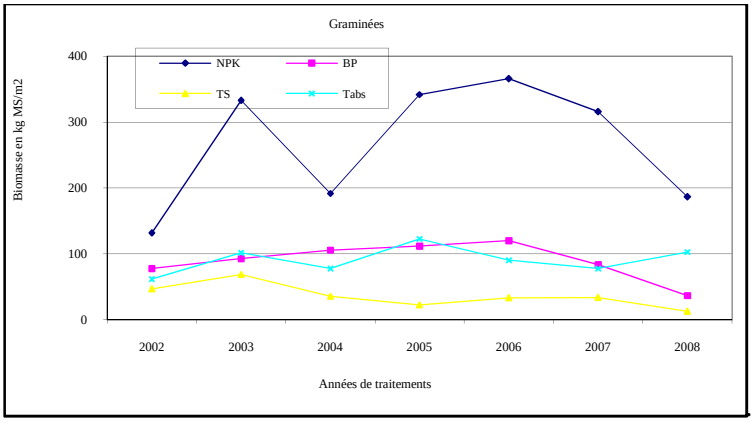


Fig. 7: Effect of mowing on the dynamics of the production of fodder legumineae

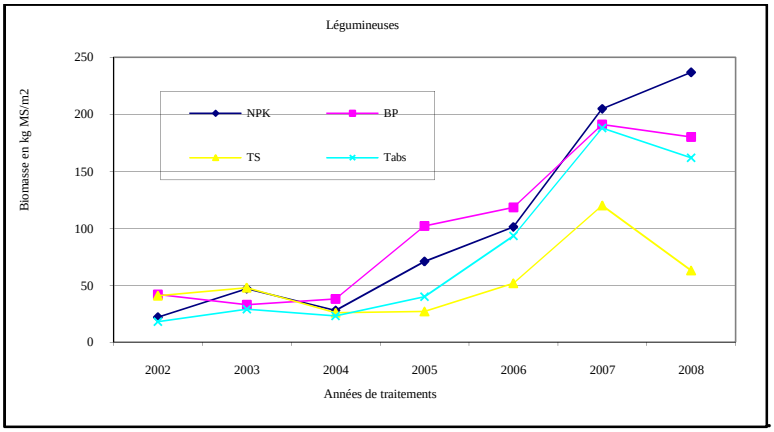
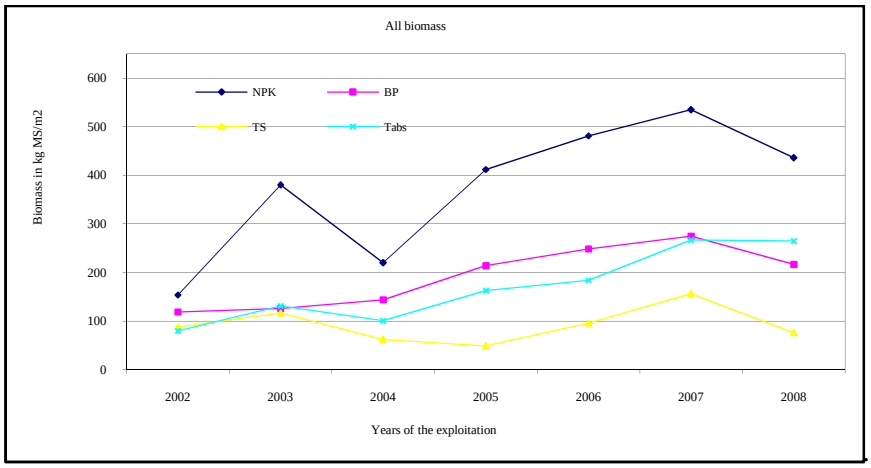


Fig. 8: Effect of mowing on the dynamics of fodder production of the all plots



As a remark, the increases of the fodder production in comparison with the simple exploitation parcel is for 5,7 times on average for the NPK , 2,9 times for the Burkina phosphate and 3,5 time for the parcel where the biomass exploitation is not applied . The treatment of effects increases the time of exploitation. Between the first year and seventh ,the increase is for 2,2 times with NPK fertilizer, 1,8 times with the BP and 3,3 times for the witness parcel (non exploited). The simply exploited parcel in the same condition has decrease its productivity for 0,8 times between the first and the seventh year of exploitation. The inter-annual variations are high, but reveal on average that the continual exploitation of pasturages without any contribution leads to a decrease of the fodder production.

Nutriments

Soils

The results of chemical analyses reveal a poor soil in the major component of organic matter, nitrogen, phosphor and potassium. Nevertheless, some differences are seen with the treatment, the exploitation without restitution has significantly realized the tenor in Nitrogen, available phosphor and Potassium at the end of four years. These elements exist in the fertilized parcel, in spite of exploitation in comparison with absolute witness. Moreover, the dynamic of the tenor in organic matter has been realized slowly because of the differences obtained between the treatments that are not significant. (Table 1)

Tableau 1: Chemical composition of the soil in April 2005 according to the treatments

Treatments	Carbone g/kg	MO %	N_total N-g/kg	P_total P_mg/kg	P_disponible P_mg/kg	K_total K-mg/kg	Rapport C/N
N P K/urea	1,18±0,23^{a}	0,20±0,04^{a}	0,23±0,05^{a}	83,05±10,93^{a}	8,30±4,83^{a}	237,78±24,83^{a}	5,27±0,20
Burkina phosphate	1,10±0,04^{a}	0,19±0,01^{a}	0,20±0,03^{b}	96,01±29,80^{b}	13,54±6,48^{b}	233,71±23,90^{a}	5,81±0,82
Simple exploitation	1,11±0,25^{a}	0,19±0,08^{a}	0,14±0,02^{b}	63,74±11,00^{c}	3,91±1,29^{c}	294,97±44,97^{b}	5,65±0,95
Absolute witness	1,23±0,10^{a}	0,21±0,02^{a}	0,16±0,01^{c}	63,77±11,25^{c}	1,98±0,27^{d}	347,96±43,90^{c}	5,72±0,90

Fodder

The given results show 12 samples of fodders of gramineae *(Schoenefeldia gracilis* , *Aristida adscensionis, Brachiaria distichophylla*) and 12 other legumineae (*Zornia glochidiata Alysicarpus ovalifolius*) taken at the end of august in 2005 inside the observed parcels during the exploitation . The evaluation was on the dry matters (DM%), the cinders (MM%), the crude cellulose (CB%) and the total of the nitrogen matter .

The gramineae phytomasse is characterized by chemical compositions whose values in CB, DM do not show some significant variations between the treatments (Table 2). However, the content of cinders is significantly high in the parcels exploited with BP than those without any contribution. The chemical composition of nitrogen matter is significantly two times highest in the fertilized parcels with NPK than the other parcels. The bromatologic analysis of legumineae reveals that the treatments have gotten less effects in comparison the gramineae. The measured CBs in the fertilized parcels with BP and the absolute witness are high, then theoretically less digestible than those of the two other treatments. On the whole, these fodders have some major qualities than the gramineae at this stade of exploitation in spite the treatment effects. The chemical compositions do not differ with treatments. With significant increase of fodders, the total yield has highly been increased. She is about 38,80 kg /ha/year at the end of vegetation period in the fertilized parcels with NPK + urea after four years of continual exploitation without restitution and only 5,33 kg/ha/year in the exploited parcels without restitution. The contribution of BP permits to maintain the

level of production in spite of integral exploitation by the mowing. The increase is real, but no significant in comparison with the absolute witness. In comparison with the treatment, the fertilization with NPK + urea gives an increase for 4 to 5 times.

Tableau 2: Composition chimique du fourrage le 29 août 2005

Parameters	Treatments			
	N P K + urea	Burkina phosphate	Simple exploitation	Absolute witness
	Gramineae			
Number of samples	3	3	3	3
%DM	94,90[a]	95,18[a]	95,26[a]	94,76[a]
%MM	6,58[a]	7,74[ab]	8,14[b]	6,80[a]
%CB	47,51[a]	47,27[a]	50,75[a]	47,89[a]
% Total nitrogen matter	8,14[a]	4,83[b]	4,63[b]	4,32[b]
Digestible nitrogen matter (g/kg of DM)	40,42	9,64	7,81	4,90
Phytomasse kg/ha/year	3415,93[a]	1123,09[b]	225,00[c]	1230,06[b]
Total nitrogen matter (kg/ha/year)	27,81	5,42	1,04	5,31
	Legumineae			
Number of samples	3	3	3	3
%DM	93,62[a]	93,95[a]	93,65[a]	93,50[a]
%MM	6,46[a]	5,92[a]	5,99[a]	5,15[b]
%CB	42,67[ab]	44,37[b]	38,38[a]	43,49[ab]
% Total nitrogen matter	15,56[a]	14,85[a]	15,90[a]	13,94[a]
Digestible nitrogen matter (g/kg of DM)	109,32	102,73	112,48	94,30
Phytomasse kg/ha/year	706,74[ab]	1016,89[b]	269,63[a]	402,96[ab]
Total nitrogen matter (kg/ha/year)	10,99	15,10	4,29	5,62
	Gramineae + Legumineae			
Phytomasse kg /MS/ha/year	4122,67[a]	2139,98[b]	494,64[c]	1633,03[b]
Total nitrogen matter (kg/ha/year)	38,80	20,52	5,33	10,93

Per line, values having the same letter are not significantly different at the 5% level.

The estimation of production costs

The evolution results related to the production costs reveal that each treatment has an estimation of constant charges, essentially concerning fertilizers and variable charges represented the exploitation labor (Table 3). The expenses related to the NPK + urea parcel is about 36000 FCFA/ha/year and those of Burkina phosphate 20000 FCFA. Out of production consideration the charges linked to labor of production is more important in the same parcels. Then generate more important costs of production per kg of phytomasse. However, the production margin remains more important on average in the fertilized parcels (26,8 to 27,5 CFA/Kg of produced fodder) in comparison with the others (15,8 FCFA/Kg). Nevertheless, they vary according to the pluviometry which determines the level of the annual production. Taking into account, the parcels which are continuously exploited without fertilizers early reveal some problems of profitability from the third year of exploitation.

Tableau 3I: Evaluation of the costs of production of fodder per hectare (average of seven years of observations)

Parameters	NPK + urea	Burkina phosphate	Simple exploitation	Absolute witness
1. Fixed cost*	**36000**	**20000**	**0**	**0**
Chemical fertilizers (NPK, Burkina phosphate)	24000	20000	0	0
Urea	12000	0	0	0
2. Variable cost	**64116**	**32838**	**14534**	**26897**
Labor for fertilization	**5000**	**2500**	**0**	**0**
Labor for mowing	33282	17080	8182	15143
Cost for the packaging of the fodder	18702	9598	4598	8509
Cost for the transport of the fodder	7132	3660	1753	3245
3. Fodder production kg DM/ha/year	3740	1920	920	1702
Cost of production of the kg of fodder	26,8	27,5	15,8	15,8
Unit price of the forage / kg of DM	60	60	60	60
Gross margin of the fodder production	224426	115174	55174	102111
Net margin of the fodder production	124310	62336	40641	75214

DISCUSSION

The reading of mowing effects made in the parcels has revealed a decrease of annual gramineae, above all represented by *Schoenefeldia gracilis* while the legumineae (*Zornia glochidiata*) increase. It is known that the legumineae suffer more because of the effects of pasturage exploitations by mowing when they are fertilized. The effect of inter-annual variations concerning the pluviometry and of the protection has played an important role in the dynamic.

The results of recovering dynamic linked to the different treatments have demonstrated that the continual taking without any contribution accentuates significantly the decrease of pasturage and this damage is attenuated when the parcels are fertilized. This damage is important after to early years of continual exploitation. This results are conforms with the analyses of different authors [4, 10] which show that any measure of management has an impact on the careers. This fact accentuates the flow with a risk of damage. This continual taking of phytomasse on the careers leads to their damage that can be seen from the third year of exploitation. The speed of damage is less important depending on whether the pasturages are fertilized or not.

The production of phytomasse at the end of August to the beginning of September constitutes an important parameter in the appreciation of a pasturage value and conditiones the strategy of breeders concerning breeding. As the floristic composition, this production has been dependent on the rain fall variation. The fertilization increases the fodder production which does not suffer from the continual mowing. After seven years of continual exploitation this fertilized parcels representes some signs decrease, the contribution of NPK + urea has been more profitable contrary to Burkina phosphate which has only permitted to maintain the same level of production as the treated parcels tabs (without exploitation). Besides the last to treatments have shown a fodder production curve which is stable that is to say less dependent on the pluviometry variations. The contribution of the fertilizers shows through this experimentation, after the fashion of Breman and Redder [4] conclusions that in this type of pasturage, water and nutritive element (fertilization) reduce the fodder production. The contribution of nutritive element plays an important role in the retention of the soil quality and the produced fodder as the sayings of many authors [1, 7]. The experimentation has revealed that after four years of exploitation, the soil has been damage from the organic matter, the nitrogen value and the available phosphor. This decrease linked to the mowing has been accentuated by the lack of organic matter, nitrogen and of phosphor in the soil [14]. The contribution of mineral fertilizers has maintained the quality to the equivalent value concerning the situation without exploitation. The available phosphor has been significantly increased in the fertilized parcels. In spite of this chemical poverty, the production of phytomasse is important. The unity of silting is characterized by a perfect consistence which is favorable to an enrichment, a rough structure goodly aired which allows the breathing. The utilization of the water becomes easy because of the ventilation and the weakness of inhalation that exert these soils on the quantities of available water during the active period of vegetation. The utilization of the water coming from the soil is not possible when the inhalation force of roots is not superior to ones of the soil. When the climatic conditions are satisfied, the plants (in generally demanding less to the chemical richness of the soil) of sandy soils develop correctly. At the end of august to the beginning of September, the fodder value of pasturage is relatively good, particularly for legumineae which are made up of *Zornia glochidiata* and of *Alysicarpus ovalifolius* (more than 14% of total nitrogen). However the quality of gramineae is mediocre in all the parcels except this treated with NPK where the values are always interesting and theoretically contribute to feed livestock [4]. These values can be justified because in 2005 ,the rainy season started earlier from June so much so that at the end of august, all the gramineae ended their vegetative cycle .The quantities of produced nitrogen per unit of surface become more important in these last parcels for four times more than in the parcels without exploitation and about height times than ones exploited with any contribution . The exploitation of pasturage by mowing for the haymaking of fodder at the end of august – the beginning of September depreciates with time, the value of the soil and the potential production of nitrogen per unit of surface. The contribution of fertilizer NPK + urea or of Burkina Phosphate gives the possibility to raise the quantity and to ensure the duration of exploitation by mowing.

The results brought by experimentations have revealed that the production of phytomasse was surely profitable regarding the charges linked to the price of fertilizers and on the one hand the labor of production and on the other hand opportunities concerning the costs of fodders on the markets of our study zone. This conclusion contrasts with this of Breman and Ridder [4] according to which the utilization of chemical fertilizers do not favor the extensive breeding because of the fertilizer prices established in the year 80s (evaluation years). But these authors had also indicated that this conclusion was only linked to the site, to the time, to the production system. With the development of actual system of breeding, the fodder sale in the cities and campaigns and the price of fodders established in dry season, the utilization of fertilizers is profitable. However in the Sahel, applying techniques is a problem. Their application is done with difficulties in many domains of agricultural production. Itinerary techniques for cultures, the improved techniques in breeding, the adjustment and the management of careers etc. With the demographic pressure which is more and more worrying, the monetarisation of rural life, the of prices and the disponibility of modern fertilizers for the production; the improvement of pasturage for mowing and an haymaking of the fodder remains a viable alternative for a short and long –term .

CONCLUSION

The conclusion of this experimentation reveals that the mowing in a system of exploitation damages the natural pasturages. As far as floristic is concerned, the damage affects above all some species as *Alysicarpus ovalifolius*,

Schoenefeldia gracilis etc, which begin to disappear from the third year of continual exploitation. Nevertheless *Zornia glochidiata* is more resistant to the effects of mowing after many year s of exploitation. The risks of the soils damage and of fodder production are important from the third year of exploitation particularly when the parcels are not fertilized. The application of chemical fertilizers (NPK + urea) and Burkina Phosphate) increases considerably the level of the fodder production, and reduces the speed of the soil damages linked to the exploitation. This stimulation of the fodder production by the contribution of fertilizers is economically profitable. Nevertheless, some readings must be extended at the same time for some other parameters as the biology of soil, the degree of infiltration etc in order to master the deadlines of this form of exploitation concerning the damage.

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