

Characterization of agro morphological variability for tree Moroccan cactus pears cultivars (*Opuntia ficus indica Mill*) : Moussa, Aïssa and Achefri.

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Introduction

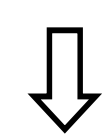
Opuntia ficus-indica Mill is a species of cactus and is a typical crop for dry environments and unfavourable areas with a highest economic importance and is one of the alternative crop, in particular for marginal lands. It is cultivated for its fruits, cladodes used as fodder, or as host of the cochineal insect.

In Aferket, *Opuntia ficus-indica* is represented essentially by three cultivars : Aïssa, Moussa and Achefri.

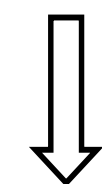
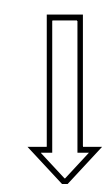
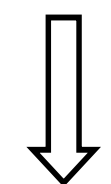
The objectives of this study were to evaluate the variation of agro morphological traits in three cultivars of cactus (Moussa, Aïssa and Achefri) grown in the localities of Aferket which located 60 Km from Guelmin.

Material and methods

20 agro-morphological characters were measured on 10 randomly selected plants for each cultivars



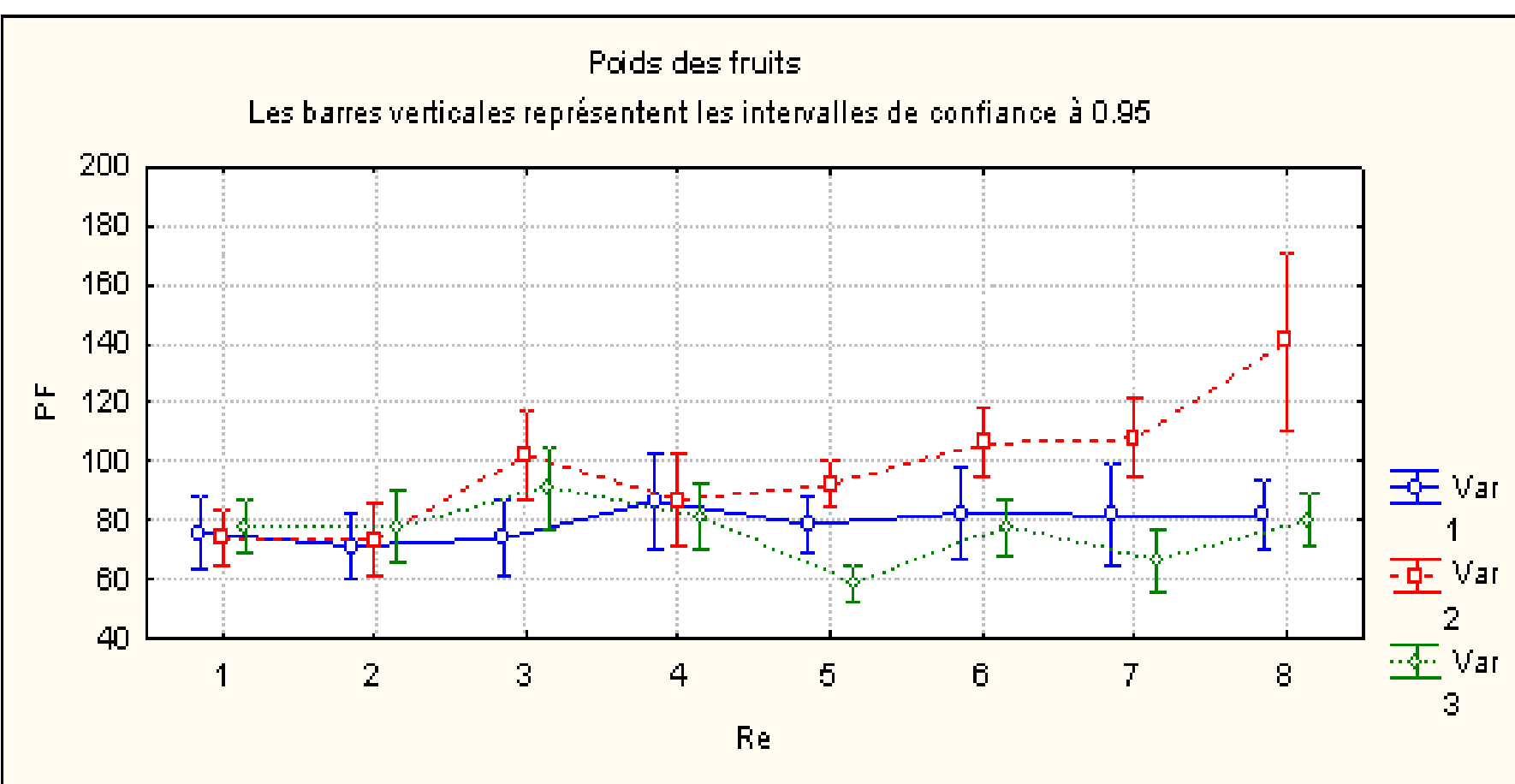
Every 15 day during two months we count



Number of flowers per plant

Number of fruits per plant

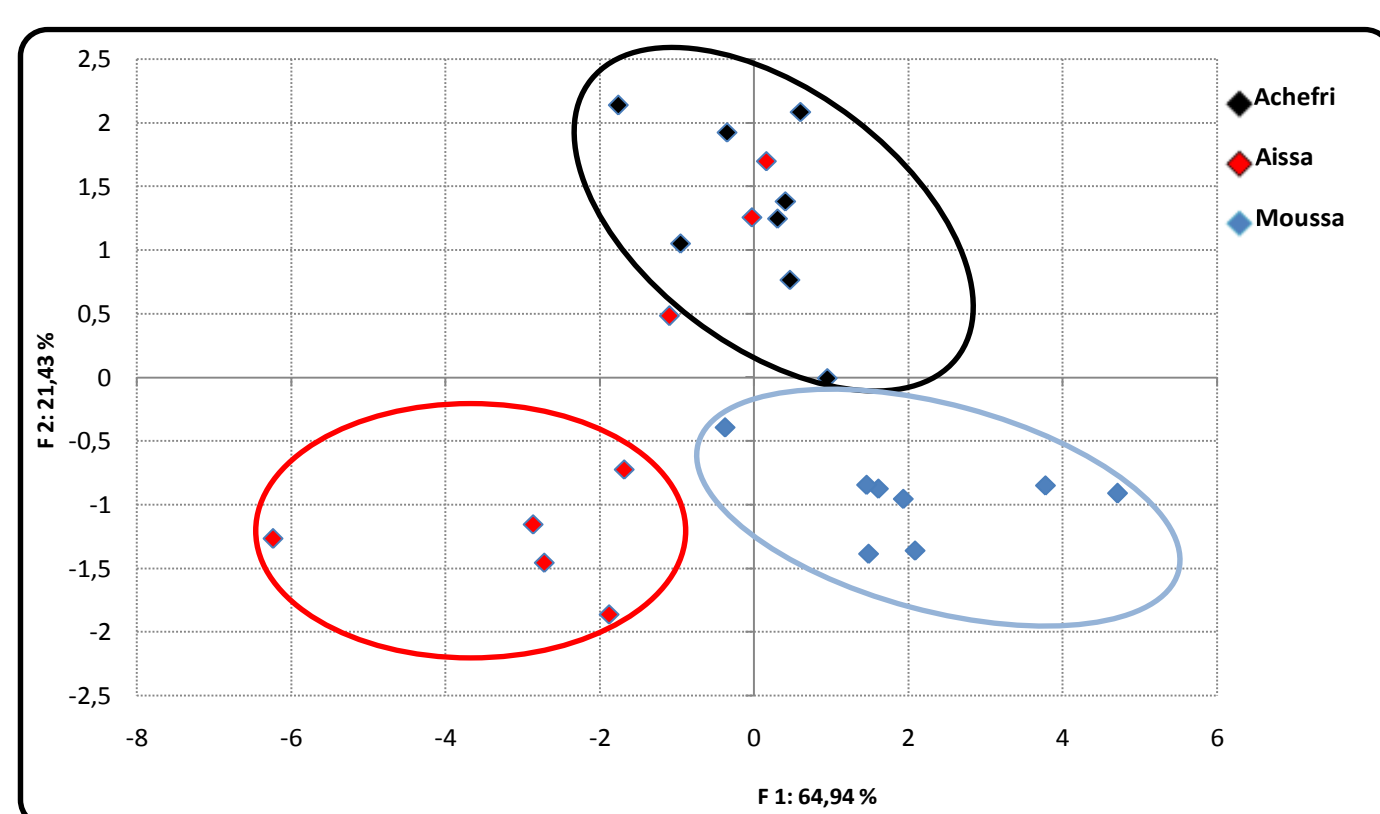
Number of newly formed cladodes



Variability of fruits Weight for the three cultivars

Var1: Achefri Var2: Aïssa Var3: Moussa

PCA



Plotted values of the first two components (F1 F2)

Mahalanobis distance

	Achefri	Aïssa	Moussa
Achefri	0.000000	14.90800 4.96934 0.004509	31.18892 10.39631 0.000103
Aïssa	14.9080 4.96934 0.004509	0.000000	30.07088 10.02363 0.000127
Moussa	31.1889 10.39631 0.000103	30.07088 10.02363 0.000127	0.000000



Localization of Aferket in the Province of Guelmim

Characters measured

- | | |
|-----------------------------|---------------------------|
| Plant height | Fruit length |
| Plant length | Fruit width |
| Plant width | Fruit weight |
| Number of cladode per plant | Fruit thickness |
| Length of cladodes | Number of seeds per fruit |
| Width of cladodes | Weight of seeds per fruit |
| Thickness of cladodes | Peel thickness |
| Number of fruits per plant | Peel weight |
| | Brix |

Analysis of variation: number of Seed and Seed weight

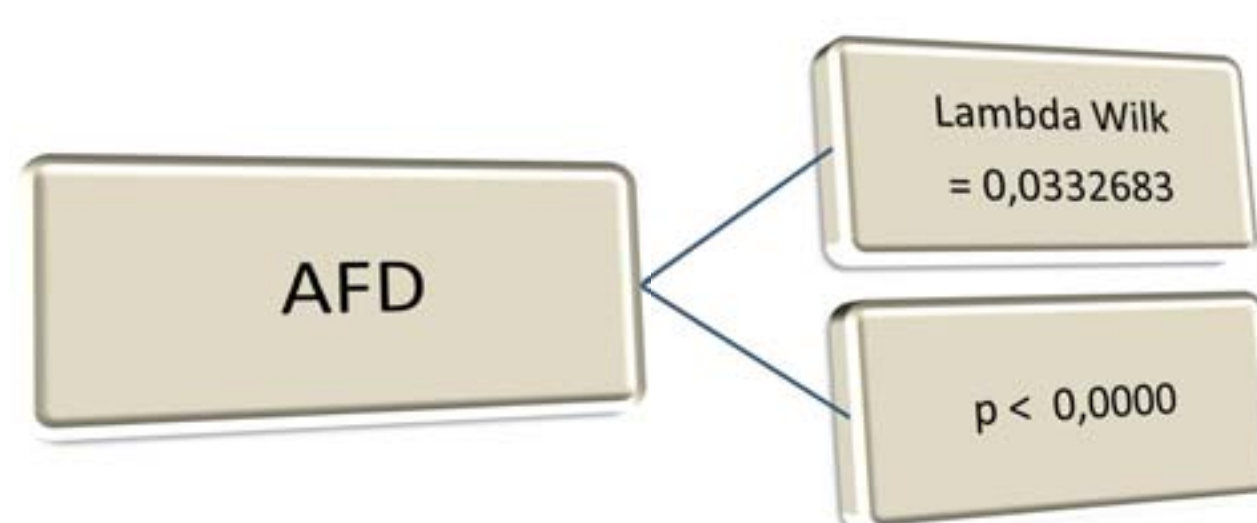
NS: Number of Seed

	Min	Mean	Max	CV _p (%)
Moussa	130	243	434	22.27
Aïssa	196	333	506	18.60
Achefri	139	270	425	22.91

SW: Seed weight

	Min	Mean	Max	CV _p (%)
Moussa	1.65	3.03	4.84	24.26
Aïssa	2.61	4.15	6.78	20.20
Achefri	1.65	3.44	5.4	23.82

Discriminant Fonction Analysis: DFA



P < 0.001 there is a high significant differences between the three cultivars

wilk's lambda near 0, the three cultivars are well separated.

conclusion

The results show that Moussa cultivars is characterized by late production compared to the two other cultivars.

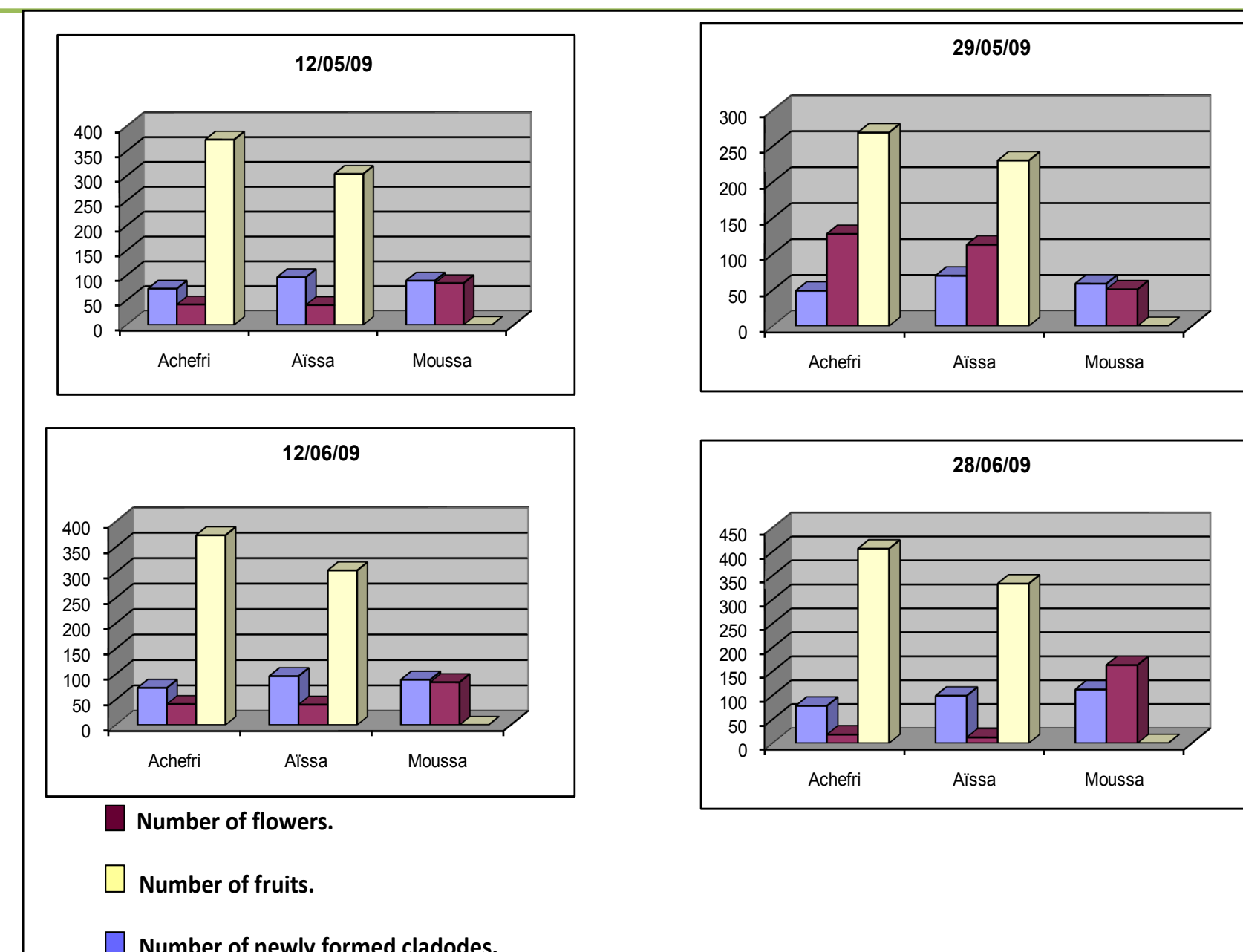
The maximum of flowers and cladodes production was occurs in the month of July and the maximum of fruit production takes place in October.

Statistical analysis of data performed using analysis of variances, principal components analysis (ACP) and discriminant function analysis (AFD) showed that the tree cultivars are well separated and distinguishable from each other and there is a large amount of variability within cultivars.



Cultivar of Aïssa in Aferket

results



Evolution of number of fruits, number of flowers and newly formed cladodes every 15days during two months

Principal Components Analysis (PCA)

Eigenvalues, Percent of variation and cumulative percent.

	Val pro	% total var	Cumul val.pro	Cumul %
1	5,195574	64,94467	5,195574	64,9447
2	1,714395	21,42994	6,909969	86,3746
3	0,510718	6,38398	7,420688	92,7586
4	0,251761	3,14701	7,672449	95,9056

the first two principal components accounted 86.37 % (64,94 % for axe1 and 21,43 % for axe2)

Percentage of well classified

	%	Achefri	Aïssa	Moussa
Achefri	87.5000	7	1	0
Aïssa	100.0000	0	8	0
Moussa	100.0000	0	0	8
Total	95.8333	7	9	8

The Percentage of well classified : 100 % for Aïssa and Moussa and 87.50 % for Achefri

The greater squared Mahalanobis distance is observed between Moussa and Achefri (31.18) while the lowest distance is recorded between Aïssa and Achefri (14.90).