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Quantitative analysis of alfalfa F₁ from different hybrid methods

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Key words : alfalfa , cross combinations , inverse cross combinations , quantitative characters , average heterosis

Introduction Alfalfa (*Medicago sativa*) is an excellent forage , in which heterosis is affected by several factors including hybridization methods . This study focused on analyzing the quantitative characters average heterosis of F₁ generated from different hybridized combinations between Acrora ,13R Supreme (GT13R) ,Archer II ,AC-3 and Deqin alfalfa .

Materials and methods Implement obverse and inverse cross between Alfalfa in Deqin (Deqin in short) and other introduced cultivars respectively ,Deqin was female parent in obverse cross and male parent in inverse one . First to measure 14 quantitative characters(QC in shot) 3 in yield leaf(A) ,stem (B) and total(C) ; 9 in growth potential : branches number (D) , stem diameter (E) , absolute height(F) , natural height(G) , longest stem's average internode length(H) ,node number(I) , leaf number(J) , longest lateral branch length(K) and branches number (L) ; 2 physiological characters :net photosynthetic rate (M) and transpiration rate(N) of all parents and their F₁ ,then to calculate and compare average heterosis (Yun J .F . ,2000) of these characters for different F₁ . If more than 4 out of 9 determining growth potential characters' average heterosis are positive (negative) in one group ,namely define that of the combination is positive(negative) .

Results and discussion Significant difference exists in yield characters' average heterosis of all F₁ especially of GT13R combinations , as positive heterosis is remarkable of F₁ from obverse cross while from inverse is worst ; Negative heterosis is shown by F₁ of ♂ Acrora × ♀ Deqin , the other is opposite ; Both F₁ from Archer II combinations show positive heterosis and from AC-3 combinations perform excellently however the inverse one is better .For average heterosis of physiological characters , the same tend as of yield ones appears in F₁ from GT13R and Acrora combinations respectively ; F₁ from Archer II combinations perform no significant difference ; Negative heterosis was get from ♂ AC-3 × ♀ Deqin and if inverse , positive in M and negative in N emerged .

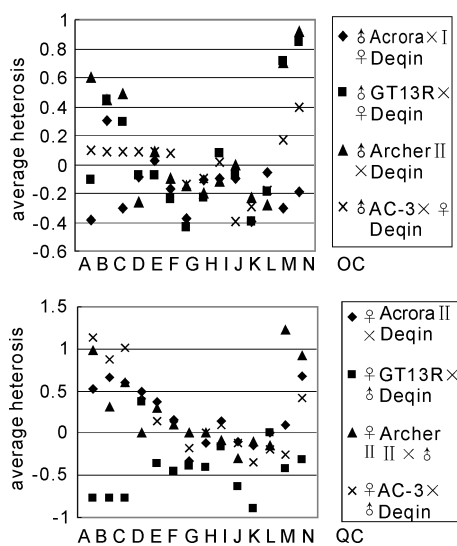


Figure 1 Quantitative Characters Average Heterosis in F₁ from Obverse Cross (I) & Inverse Cross (II)

Conclusions It is clear yield , growth potential and physiological characters of F₁ are various resulted from different hybrid methods , that means characters especially in yield presented by F₁ from different combinations are influenced by cytoplasm at different level . GT13R and Acrora combinations are influenced obviously yet only yield character in Ac-3 combinations is significantly influenced ; in Archer II ones non influence appears nearly . Therefore , quantitative characters of F₁ are influenced by hybrid methods , the extent of this influence rests on genotype of parents .

Reference

Yun J .F . 2000 . Forage and Feed Crops Breeding Science . BeiJing : China Agriculture Publishing House , . 69-70 .