African Journal of Agricultural Research

Afr. J. Agric. Res.

Vol. 2 No.3

African Journal of Agricultural Research Vol. 2(3), pp. 080-088, March, 2007
ISSN 1991- 637X© 2007 Academic Journals

Full Length Research Paper

Effects of variety and row spacing on radiation interception, partitioning of dry matter and seed set efficiency in late season sunflower (*Helianthus annuus* L.) in a humid zone of Nigeria

Agele, S. O. [1*], Maraiyesa, I. O.[2] and Adeniji, I. A[2]

[1]Department of Crop, Soil and Pest Management, Federal University of Technology, Akure, Nigeria.
[2]ARMREC, University of Agriculture, Abeokuta, Nigeria.

*Corresponding author. E-mail: ohiagele@yahoo.com.

Accepted 16 February, 2007

Abstract

In the tropics, crops sown in the late season are subjected to concurrent stresses of high air and soil temperatures, large saturation vapour pressure deficits and negligible soil water regimes. The responses of three sunflower cultivars to row spacing was analysed in terms of radiation interception and use, plant to plant variability, biomass accumulation and seed set efficiency during the late seasons of 2002 and 2003 on the field in Akure, a rainforest zone of Nigeria. Sunflower cultivars (Functua local, Record and Isaanka) were cropped at 90 x 30, 90 x 60 and 60 x 30 cm row spacing corresponding to 37,037, 18,519 and 55,555 plant.m^{-2} Increasing density of plant stand appeared to have promoted differences in resource availability per plant during growing season. Row spacing did not significantly affect IPAR while the effects of spacing and cultivar were similar on RUE. Leaf area and dry matter accumulation are suboptimal but RUE appeared to be conservative in circumstances of high saturation vapour pressure deficit and soil moisture stress of the late season. Crops in wide rows intercepted less radiation than their counterparts in narrow rows, and yield response to narrow rows was significant in all cultivars. Seed yield/ha increased as plant density increased although yield of the individual plants and their components were significantly reduced. Among the cultivars, differences in the growth of individual plant at different intensities of inter plant competition were obtained, narrow row spacing enhanced plant-plant variability (inter-plant variation). Under the limiting soil water situation enhanced soil temperatures of the late season EF relates to plant biomass ($r^2 > 0.70$), dry matter relates to accumulated intercepted radiation IPAR ($r^2 > 0.90$) and fractional intercepted radiation (fIPAR) relates to seed yield ($r^2 > 0.95$) while fIPAR is a function of

thermal time (TT) ($r^2 > 0.80$).

Key words: Sunflower, cultivars, late season, RUE, extinction coefficient, plant-plant variability, dry matter partitioning, seed set, seed yield