Effects of surface cover, water and nitrogen on attributes of maize canopy at tasseling

Irigoyen, A.I.; Cambareri, M.A.; Echarte, L.; Bayala, M. I. and Rivas, R.E.

Revista Argentina de Agrometeorología RADA, v. IX (2018): 75-84

Summary

Canopy structure includes size, orientation and spatial distribution of aerial organs and its description is essential to understand the exchanges of mass and energy that determine radiation interception, evapotranspiration and crop yield. Besides the canopy functionality can be also described by chlorophyll content. The objective of this manuscript is to characterize attributes of the canopy structure and functionality at tasseling, a critical stage for grain yield definition, in maize grown under contrasting soil water availability, nitrogen supply and soil surface cover. One field experiment was conducted at Balcarce (Argentina) during the 2015-2016 growing season. An intermediate hybrid was sown on 4 November with a density of 6,2 plants m^{-2}. Treatments included the combination of (i) two water regimes (irrigated, R and rainfed, S), (ii) two soil covers (without soil cover, Conv, and soil with a previous cover crop of vicia (*Vicia villosa* Roth) and oat (*Avena sativa* L.), CC), and (iii) two N supplies (0, N0 and 200 kg N ha^{-1}). Canopy structural and functional attributes (i.e. plant height, number of leaves, green leaf area index, IAFV, and chlorophyll content, SPAD units) were characterized at tasseling (VT). Vertical distribution of green leaf area, SPAD units and functional leaf units were analyzed as a function of leaf insertion. Maize canopy height and green leaf area index was lower in maize with CC than in conventional maize; and the greatest leaf area reduction occurred in the middle part of the canopy, in soils without water limitations. Final number of leaves (NTH), plants height (AUL and Afin) and green leaf index (IAFV) were not affected by N supply, regardless of soil cover or water availability. Vertical distribution of functional attributes (SPAD units x green leaf area) was more uniform within canopy, in non-water limited (R) than in water limited conditions (S).

Key words: leaf area; height; number of leaves; SPAD units; normalized green