

Influence on larval distribution of physical and chemical properties of *Anopheles gambiae* complex breeding habitats in Burkina Faso

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Introduction

Three taxa of the *Anopheles gambiae* complex contribute to malaria transmission in Burkina Faso, namely *An. arabiensis* and the two molecular forms (M and S) of *An. gambiae s.s.* Previous studies on the micro-geographic distribution of the three taxa showed some degree of niche partitioning according to the nature of the larval habitat. We investigated whether physical and chemical properties of the breeding sites could contribute to explain such spatial variability.

Methods

Weekly water and larval samples were taken during the rainy season (July – October 2004) in the village of Goundri (12°30'N 1°30'W). *Anopheles gambiae* complex larvae were dipped from 107 breeding sites corresponding to 7 larval habitat categories (Lake margin, streams, pools, borrow pits, hoof prints, puddles, and pits). Physico-chemical variables recorded from each breeding site were temperature, pH, turbidity, conductivity, water hardness, O₂, CO₂, K⁺, Na⁺, Ca²⁺, Mg²⁺, Fe³⁺, NH₄⁺, HCO₃⁻, Cl⁻, SO₄⁻, NO₂⁻, NO₃⁻, PO₄³⁻. A logistic binomial model was used to examine spatial and temporal variations. Association between the relative frequency of larvae and physico-chemical variables was investigated by canonical correspondence analysis.

Results

Of 5240 larvae sampled, 3887 were molecularly identified and assigned to species and molecular form. The larval relative abundance changed across time: the proportion of *An. arabiensis* larvae steadily increased from the start to the end of the rainy season, though *An. gambiae s.s.* consistently remained the most abundant taxon. Among the two molecular forms of *An. gambiae*, the S-form was rare in July (5 %) but markedly increased in August-September (45 %), declining later on at the end of the rainy season (31 %). Despite such temporal fluctuations in relative abundance, *An. gambiae* M-form consistently remained the predominant taxon in the lake habitat throughout the rainy season. Canonical correspondence analysis could not detect strong consistent associations between any of the physico-chemical variables and the species / molecular forms.

Interpretation

Chemical and physical factors alone had only weak effects on larval niche partitioning between the taxa of the *An. gambiae* complex in Burkina Faso. Strong seasonal effects in the relative abundance of the larvae of the taxa were detected.