Background: The sickle cell trait is associated with protection against severe malaria. Recently it has been shown that the genetic protection conferred by the sickle cell trait has no effect on the transmission of *Plasmodium* from humans to vectors. Our study aimed to investigate putative association between the sickle cell trait AS and the susceptibility to malaria infection of both the human host and the insect vector.

Material and methods: The study was conducted from June to November 2017 among asymptomatic children living in Cameroon. The samples were collected on microscopy slides, Whatman FTA and grade 17 paper, respectively for the selection of gametocyte carriers by microscopy, the molecular diagnosis of *Plasmodium* species and sickle cell trait (PCR-RFLP). Infectivity of the mosquito was measured by experimental infections on gametocyte-containing blood from naturally infected carrier. Genetic diversity was measured using microsatellite markers. Results: 1557 children were recruited, the prevalence of *Plasmodium* infection among this group was 58% and the AS sickle cell trait 20%. No significant difference in the prevalence of *P. falciparum* infection was observed according to the sickle cell trait carriage and this whatever the parasite stage (p > 0.05). The level of infectivity of the mosquito was higher when feedings were performed on blood from HbAS genotypes compared to HbAA genotype blood, and the difference was even more significant when the blood pellet was resuspended with non-immune AB plasma (P <0.0001). No significant difference was observed in the infection complexity between HbAS and HbAA genotypes (p > 0.05). Conclusion: *Plasmodium* infection is not influenced by HbAS genotype regardless of parasite stage; the risk of anophales infection is higher with blood from gametocyte carriers with sickle cell trait (HbAS). The sickle cell trait does not affect the multiplicity of infection.