**Highlights**

* Level of insecticide resistances and diversity in *Anopheles* mosquitoes in northern Uganda were studied.
* High intensity of resistance was observed with deltamethrin and permethrin
* *An. gambiae* senso stricto was susceptible to malathion and bendiocarb
* *Anopheles gambiae s.s* is the predominant malaria vector in northern Uganda followed by *An. arabiensis*
* Mosquitoes have metabolic resistance to the pyrethroids with minimal genetic (KDR) mutations for resistance