



## **Application of Remote Sensing and GIS for Geoinformatics Based Study to Assess the Population Dynamics of Mosquitoes in a Part of Gwalior City (M.P.)**

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### **Abstract:**

Human health affected by arthropod vector borne diseases continues to be a global problem and their control is becoming difficult. Application of remote sensing and the functionalities of GIS can help in this regard. Aim of the study is to map mosquito population dynamics, species composition, identify mosquito breeding area in a part of Gwalior City that lies in between 26°13'N 78°11'E to 26.22°N 78.18°E. Different mosquito breeding sites were marked by using GPS instrument. Density of mosquito larvae in water bodies was measured with ladle. After image classification IRS-2 images, built-up area was extracted and calculated affected area by using buffering and overlay utility of GIS. Results showed presence of *Culex quinquefasciatus*, *Culex tritaeniorhynchus*, *Anopheles stephensi*, *Anopheles subpictus* mosquitoes in Gwalior. Density of anopheline larvae was found less in number as compared to culicine larvae. Water samples collected from different larval habitats showed slightly alkaline in nature (pH ranged from 7.19 to 9.23), total dissolved salts ranged from 118.6 to 1119 mg/lit., salinity ranged from 0.1 to 1.1% and conductivity ranged from 239  $\mu\text{s}/\text{cm}$  to 2230  $\mu\text{s}/\text{cm}$ . GIS model shows that site G1 had higher density (>1000 larvae/ladle) of Culicine larvae during April and May 2009, which gradually decreased in June 2009 (43 larvae/ladle). Risk area identification map indicated the affected built up area that varies for different sites. Land use/ land cover classification revealed the favorable conditions for mosquito breeding like water body, vegetation, host etc. In this study it is determined that : (1) Remotely sensed reflectance data can be used to identify and monitor specific characteristics of water body with mosquito larval abundance, (2) GIS spatial

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modeling techniques can be used to describe relationships between larval habitat productivity and blood meal sources and (3) Combining the spectra and spatial components can improve the accuracy and timeliness of estimates of larval production and locations.