



运用时空扫描统计量分析江苏省高邮市钉螺时空分布

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Application of Space-time Scan Statistics in the Analysis of Spatial and Temporal Distribution of Oncomelania hupensis Snails in Gaoyou County, Jiangsu Province

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摘要

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摘要 目的 探索高邮市有螺环境的时空分布特征, 为制定有针对性的监测方案和防控措施提供参考依据。方法 收集1970-2009年江苏省高邮市历史有螺环境资料, 运用SaTScan 9.2软件进行时空扫描聚集性分析, 探索有螺环境的时空聚集区域, 并采用ArcGIS 10.1软件展示聚集结果。结果 1970-2009年高邮市历史有螺环境共有720处, 其中水网型521处, 面积约456.62 ha, 主要分布于县域北部的界首、周山以及南部的车逻和八桥等乡(镇); 湖沼型199处, 面积约4 495.75 ha, 分布于高邮湖与邵伯湖间的新民滩, 以及与安徽省天长市接壤的乔尖滩。时空聚集性分析显示, 历史全部有螺环境存在两个明显的时空聚集区, 相对危险度均> 3。其中第1处聚集区为1983-2002年, 出现在新民滩; 第2处聚集区为1970-1973年, 出现在县域北部。按水网地区和湖沼地区进行独立分析, 则各存在2处时空聚集区。1970-2009年高邮市共新发现有螺环境244处, 其中水网型有螺环境130处, 湖沼型有螺环境114处。时空聚集性分析显示, 有2个明显的时空聚集区。按水网地区和湖沼地区进行独立分析, 则各存在2处时空聚集区。结论 时空扫描统计量能够探测到有螺环境在二维时空的聚集区域, 可为采取有针对性的监测和防控措施提供参考依据。

关键词: 血吸虫病 钉螺 地理信息系统 时空扫描统计量 时空聚集性分析 江苏省 高邮市

Abstract: Objective To investigate the distribution features of Oncomelania hupensis infested areas in Gaoyou County so as to formulate surveillance and intervention strategies. Methods A database was established through collecting data of the snail infested areas during 1970-2009 in the County. The data were input into SaTScan 9.2 software for spatial-temporal cluster analysis to determine the spatial and temporal cluster of the snail habitats. The results were displayed by ArcGIS 10.1 software. Results There were historically 720 snail habitats in the County in 1970-2009 including 521 in plain region with water networks and 199 in lake & marshland region. Those in water networks covered an area of 456.62 ha distributing mainly in the northern towns/townships of the County, and the latter distributed in the Xinmin Beach between Gaoyou Lake and Shaobo Lake, and Qiaojian Beach close to Tianchang County of Anhui Province with an area of 4 495.75 ha. The spatial-temporal cluster analysis revealed that among all the historical snail habitats, there were two prominent spatial-temporal clusters with a relative risk of >3. One cluster appeared in Xinmin Beach in 1983-2002 and another one located in the north of Gaoyou in 1970-1973. Separate analysis was performed by the regions of water network or lake & marshland, indicating 2 clusters in each of the regions. During 1970-2009, 244 snail habitats were newly found in the County with 130 in water network region and 114 in lake & marshland region. Again, the spatial-temporal cluster analysis displayed 2 prominent clusters. By separate analysis, 2 clusters existed in each of the regions. Conclusion The space-time scan statistics can be applied in detecting the cluster of snail infested areas in two dimensions, which will provide information for guiding specific measures of surveillance and control.

Keywords: Schistosomiasis Oncomelania hupensis Geographic information system Space-time scan statistics Spatial-temporal clustering analysis Jiangsu Province Gaoyou County

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