Systematic road mortality survey and estimate

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The systematic road-kill survey program is a citizen scientist project hosted by the Taiwan Endemic Species Research Institute (TESRI) since July 2017 to improve the Taiwan Roadkill Observation Network (TaiRON) database and estimate the vehicle collision mortality. The first step of experimental designs, we divided Taiwan to 1,440 grids and each grid is 5 × 5 km. Total 420 sampling grids were selected by stratified random sampling methods with proportional allocations from every eco-region and road density level. Volunteers are required to survey two or more road types in every sampling grid, and every route must be longer than 3 km in January, April, July, and October per annum. After twice pretests in 2017, the program officially started at this January and April 2018. In the current survey, the roadkill information of 206 grids and 412 routes (1,648 km) have been reported by 178 volunteers, and we got 1,204 roadkill events (771 amphibians, 224 reptiles, 66 mammals, 1 land crabs, 138 birds and 4 unknown) to assess the status of roadkill in Taiwan. There is some uncertainty about survey-related biases (scavenger removal and searcher detection). We also conducted roadkill survey method bias studies between different modes of transportation, including walking, bikes, scooters, and cars. And we discovered that the surveyors could detect more carcasses with lower searching speed. Mortality rates were generated by the detection probability, and they were still with the great range of uncertainty (median = 1.02 per km; 95% CI = 0 – 28.30 per km). Although we used several approaches to simulate the census and model the range of total mortality in once survey with the uncertainty. But we believe that as the TaiRON citizen science group and the systematic road-kill survey program continue to grow. Our model will become stable and applicable for management actions to mitigating roadkill events.