**Fisher’s exact test**

**QUESTION 2.**  **2011**

Some people notice a distinctive smell from their urine after eating asparagus, while others never notice the smell. These differences could arise from variation among people in the chemical profile of the urine (i.e., how compounds from asparagus are metabolised), or from variation in the ability of different people to detect the smell.

A recent paper (Pelchat *et al.* 2010 *Chemical Senses*) reviewed these studies and presented the following data that described variation among four study populations:

|  |  |  |
| --- | --- | --- |
| **Population** | **Number of people that can detect odour** | **Number of people that cannot detect odour** |
| Israel  (Lison *et al*. 1980) | 328 | 0 |
| China  (Hoffenberg 1983) | 96 | 2 |
| USA  (Sugarman and Neelon 1985) | 10 | 5 |
| USA  (Lison *et al*. 1980) | 11 | 10 |

Answer all parts 2A to 2D.

**2A)** What statistical test could you use to detect differences among populations in the perception of the odour? (2 marks)

**2B)** What numbers of people would be expected to smell the odour in each population if all study populations had the same proportion of people able to detect the odour? (4 marks)

**2C)** Conduct the test, and give the value of the test statistic. (4 marks)

**2D)** Is your null hypothesis rejected or retained? (2 marks)

**2E)** In Pelchat *et al.*’s own experiments, only three of the 37 participants could not smell the asparagus odour in urine. Did this differ from the average proportion of people in the above studies that could not detect the odour? (8 marks)

**QUESTION 3: 2006**

You are a behavioural ecologist studying the diet of common ringtail possums (*Pseudocheirus peregrinus*) at sites (sites A and B) dominated by two species of *Eucalyptus*, (*E. ovata* and *E. sideroxylon*)*.* You notice that possums at site A tend to eat *E. ovata* and that at location B they eat *E. sideroxylon*. You have radio collars on seven (7) possums at location A and eight (8) possums at location B. You track each possum and note the species of the first tree that you observe it eating leaves from. At location A you see six (6) possums eat *E. ovata* and one (1) eat *E. sideroxylon*. At location B you see all eight (8) eat *E. sideroxylon* and none (0) eat *E. ovata*. What is the exact probability of observing this or a more extreme pattern by chance alone?