

# Zero-inflated model for the estrous cycle cell count of Wistar females after treatment with paraben

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**Abbreviated abstract:** An experiment was conducted with twenty-four female rodents of the *Rattus norvegicus* species (Wistar strain) divided into a control group and three treatment groups, corresponding to different dosages of propyl and butylparaben. Negative binomial zero-inflated models with offset were fitted to data and showed no statistically significant differences in the number of reproductive cells ( $p > 0.05$ ), but significant differences were found between the phases of the estrous cycle ( $p < 0.05$ ).

## Related publications:

– BROCHINE, Suzane. Efeitos do propil-parabeno e butil-parabeno na atividade reprodutiva de ratas wistar adultas. (2020)



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# Problem, Data, Previous Works

- Goal: Evaluate the frequency of estrous cycle phases and the cells quantity in every cycle phase.
- Problem: Fit models to analyze the number of cells on the different estrous cycle phases.
- Data: Records of reproductive cells counting (we restricted our analysis to basal, parabasal cells and leucocytes) from 24 female rodents of the *Rattus norvegicus* species (Wistar strain)
  - 6 rodents by treatment (control group, treatment groups with 10 mg/kg, 100 mg/kg and 200 mg/kg dosages of propyl and butylparaben)
  - The cells counting and estrous cycle phases were registered daily on a 90 days interval
- Previous work: The data gathered is part of the master dissertation “Efeitos do propilparabeno e butilparabeno na atividade reprodutiva de ratas wistar adultas” of Suzane Brochine.



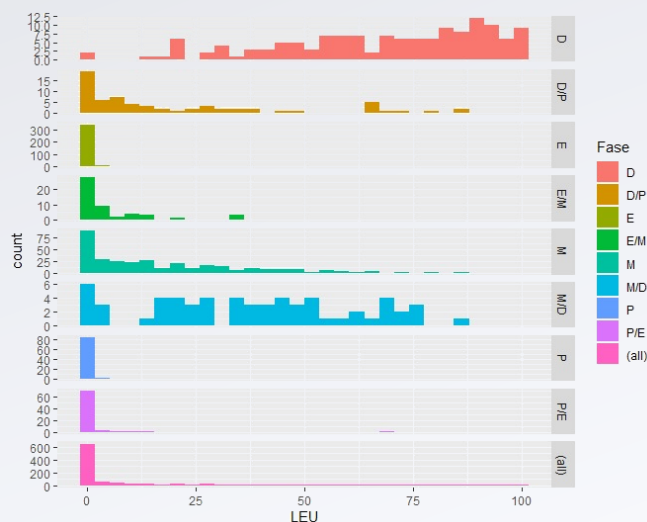
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# Methods

- We preprocessed data, removing omitted observations (due to the death of a female from the treatment group with a 200 mg/kg dosage of propyl and butylparaben).
- Considering the descriptive analysis, a different set of zero-inflated models were fitted to data



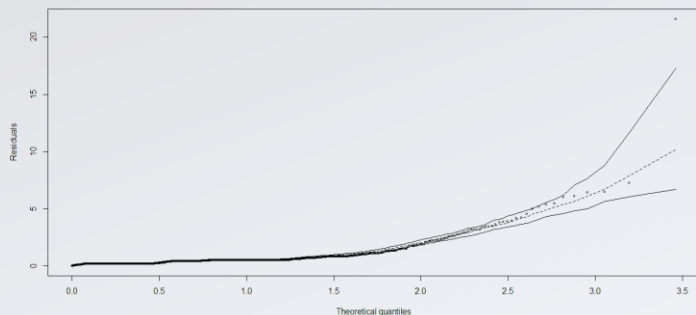
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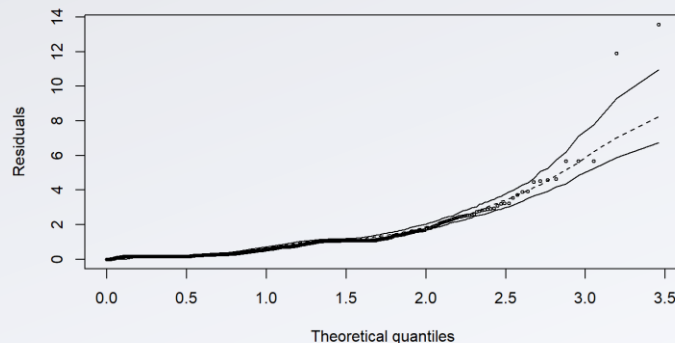
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# Results and Conclusions

`zeroinfl(BP ~ offset(log(Total))+Tratamento +  
Fase | Fase, dist = "negbin", data = dados)`



`zeroinfl(LEU~offset(log(Total))+Tratamento*Fas  
e | Fase,dist="negbin",data=dados)`



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