

# **Effect of Diesel fuel contaminated soil on germination and growth of *Zea mays* (Maize)**

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# Introduction

- Diesel fuel is one of the major products of crude oil and it constitutes a major source of pollution to the environment (Nwaogu *et al.*, 2008).
- Petroleum is one of the dominant sources of the economic and social development of a country.
- during the exploration, translation and processing, it has caused a huge relevant adverse effects such as serious problems of soil contamination and ecological risk by petroleum hydrocarbons Huang *et al.*, 2005, Hall *et al.*, 2003, Pena-Castro *et al.*, 2006)
- Soil contamination by diesel fuel poses a great threat to the farm lands and the environment as a whole.

# Introduction Contd.

- Diesel fuel can enter into the environment through spillage from tankers, leakages from pipelines, off shore wells, trucks and even from underground storage tanks (Hill and Moxey, 1960).
- Their harmful effects include inhibition of seed germination, growth, and also reduction in photosynthetic and respiration processes in plants (Samina and Adams 2002; Achuba, 2006; Sharifi *et al.*, 2007).

# Objectives of the study

- This study was designed to evaluate the effect of soil contaminated with different volumes of diesel fuel on germination and growth of *Z. mays*.
- The Information obtained from this study will help in combating the adverse effect of diesel fuel polluted soil on farm crops thus improving agricultural yield.

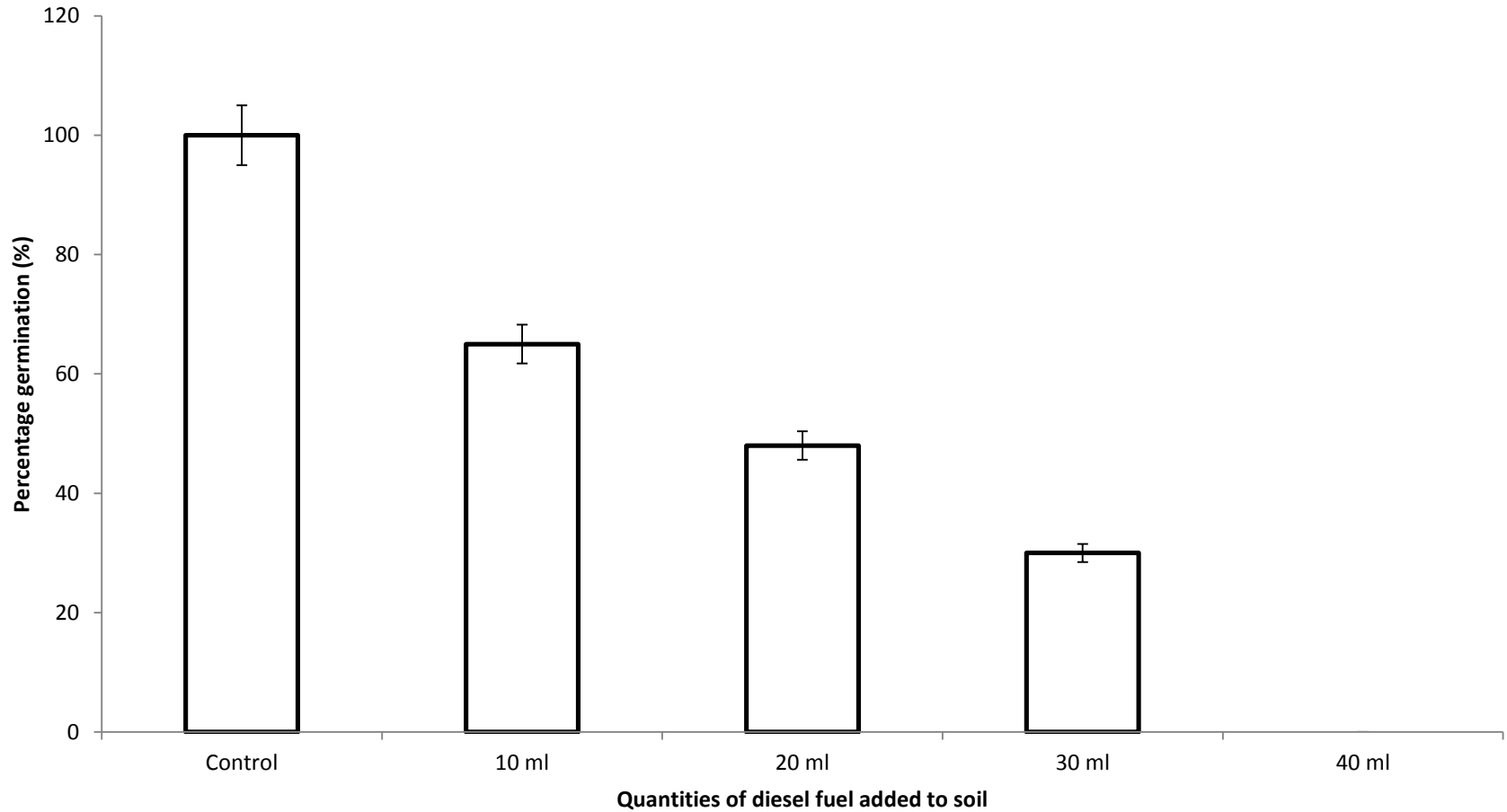
# Materials and Methods

- Germination of seeds
- Harvesting
- dry weights taken (Merkl *et al*, 2004).
- The leaf counts
- shoot and root length

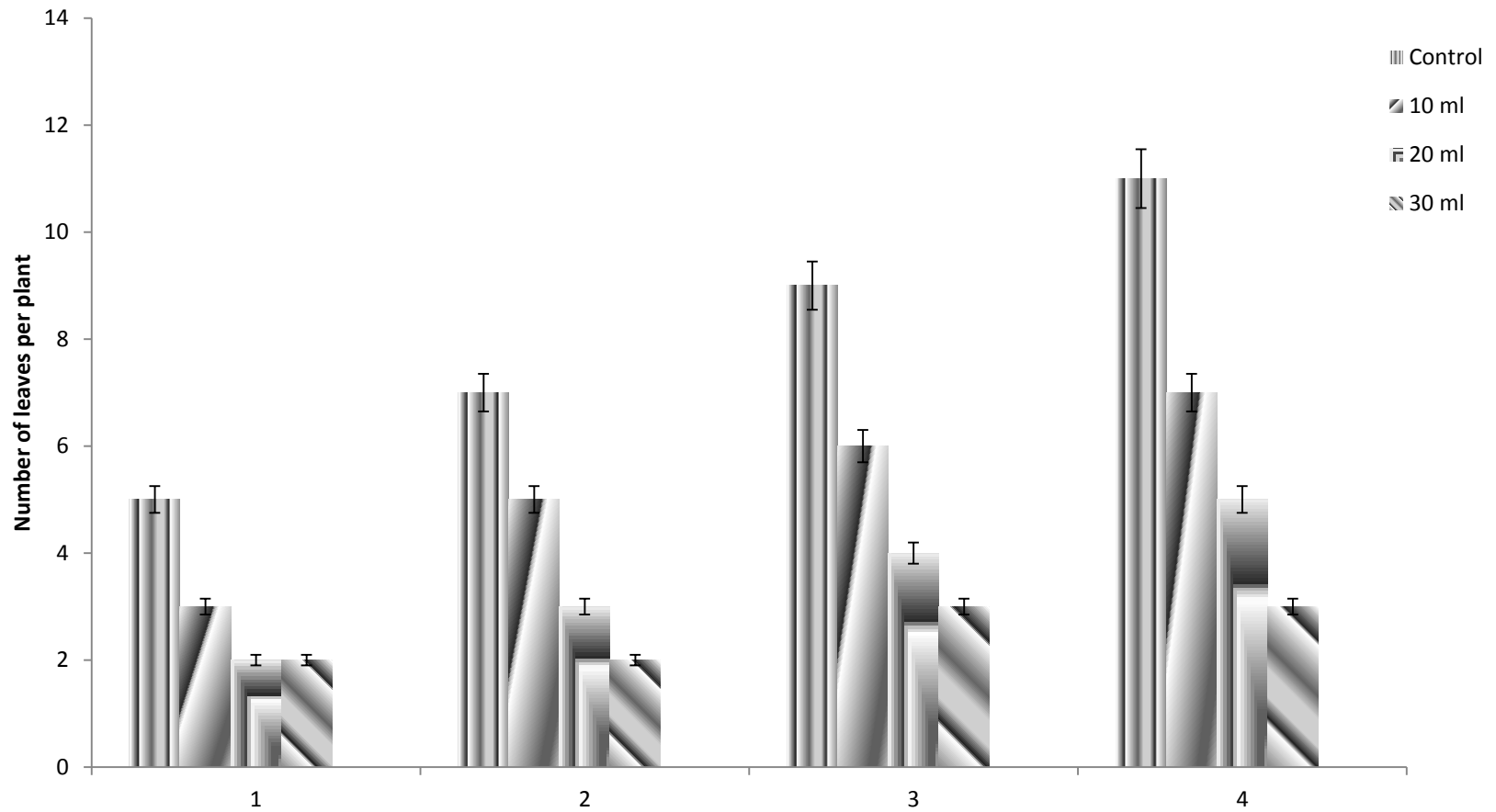
# Analysis of Data

- Analysis of variance (ANOVA).
- Pearson's correlation coefficient
- 0.05 probability level

# Results



**Figure1:** Percentage germination of *Z. mays* seeds on soil contaminated with different quantities of diesel fuel.. Values shown are mean  $\pm$  SE.



**Figure 2:** Number of leaves per plant of *Z. mays* on soil contaminated with different quantities of diesel fuel. Values shown are mean  $\pm$  SE.



**Table 1:** The mean dry weight (g/plant) of *Z. mays* grown in diesel fuel polluted soil.

Harvest periods	Control	10 ml	20 ml	30 ml
First	0.03±0.00	0.02±0.01	0.02±0.01	0.01±0.01
Second	0.04±0.01	0.03±0.01	0.02±0.01	0.01±0.01
Third	0.06±0.01	0.04±0.01	0.03±0.00	0.02±0.01
Forth	0.10±0.02	0.05±0.01	0.04±0.02	0.03±0.01

**Table 2:** The mean shoot length (cm) of *Z. mays* grown in diesel fuel polluted soil.

Harvest periods	Control	10 ml	20 ml	30 ml
First	7.50±1.30	6.00±0.80	5.20±0.68	3.50±0.04
Second	15.00±1.21	9.00±1.20	8.30±1.22	7.20±0.74
Third	26.52±2.00	17.70±1.54	14.50±1.27	10.00±1.11
Forth	34.60±1.48	24.45±1.86	17.60±1.03	12.20±1.05

**Table 3:** The mean root length (cm) of maize grown in diesel fuel polluted soil.

Harvest periods	Control	10 ml	20 ml	30 ml
First	1.80±0.08	1.50±0.13	1.30±0.14	1.20±0.07
Second	2.00±0.12	1.60±0.08	1.40±0.17	1.20±0.14
Third	2.10±0.12	1.80±0.15	1.40±0.15	1.00±0.15
Forth	1.90±0.10	1.75±0.11	1.20±0.14	1.10±0.14

# Summary

- Increased volume of diesel fuel contamination of the soil decreased:
  - The percentage germination
  - The dry weight
  - The number of leaves per plant
  - Mean shoot and root length

# Conclusion

- The findings showed that diesel fuel like the other petroleum products affects the germination and growth of plants.
- Contamination of soil by diesel fuel ultimately result to low soil fertility.

# Recommendations

- Mechanic workshops be cited in locations away from farmlands to minimize diesel fuel pollution to such soil.
- Thus will reduce the adverse effect of petroleum pollution on Agricultural crops.

Thank you for listening