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Impact Of Negative Features Of Soil Microfauna In Floodplains Area Of Chapra On Cancer Risks: A Bibliometric Review (2012–2025)

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Abstract

Present work is done in the floodplains area of Chapra. In this study various types of microfauna were found. Floodplain ecosystems host diverse soil microfauna that play important ecological roles but can also display negative features under conditions of pollution, hydrological disturbance, and organic accumulation. In many floodplain regions, industrial effluents, agricultural runoff, and heavy-metal-laden sediments accumulate in soils, affecting the composition and metabolic activity of micro faunal communities. These altered microfauna can influence carcinogenic processes indirectly through biotransformation of pollutants, mobilization of heavy metals, and amplification of pathogenic micro organisms. This study reviews the potential pathways linking degraded soil microfauna in floodplain areas with increased cancer risk in human populations. In this study to control the negative of soil microfauna various types of pesticides, insecticides, herbicides, nematicides impact are used, which are responsible for rapid increase in cancer cases through inhalation, ingestion and dermal contact. Impact of negative features of soil microfauna in floodplain area on cancer is based on Bibliometric analysis of the studies published between 2012 to June 2025. For this study 105 papers selected from the Scopus, Google scholar and Research gate database. The types of cancer reported most frequently were gall bladder cancer, multiple myeloma, prostate cancer, breast cancer, leukemia, melanoma, colon cancer lung cancer, ovarian cancer and lymphoma. Due to lack of awareness, such type of pesticides, insecticides, herbicides are being used and are increasing the number of Cancer patients year by year.

Keywords: - Microfauna, cancer, pesticides, soil, floodplain, Impact.

1. Introduction

Floodplains are dynamic ecosystems formed by periodic inundation from adjacent rivers. Their soils are rich in nutrients and organic matter, making them major hubs for agriculture and biodiversity. Among the essential biological components of these systems are soil microfauna, including protozoa, nematodes, mites, rotifers, and other microscopic organisms. These organisms contribute to soil aeration, nutrient cycling, organic matter decomposition, and improved crop productivity.

However, certain micro faunal groups—particularly parasitic nematodes and pest-associated species—can negatively affect crop yields. Farmers commonly manage these populations through chemical controls such as pesticides, herbicides, insecticides, and nematicides. While these substances help suppress harmful soil organisms, their persistent and excessive use has led to widespread environmental contamination.

Human exposure to agrochemicals is a major public health concern in agricultural landscapes. Numerous studies have documented links between chronic exposure to these chemicals and various cancers. Floodplain communities, which rely heavily on agriculture and often lack adequate safety awareness, are particularly vulnerable.

This research paper aims to synthesize the existing literature on :

(1) Negative consequences of soil microfauna's management in floodplains, and
(2) Associated cancer risks arising from chemical pesticide exposure, using a Bibliometric review of studies published between 2012 and June 2025.

2. Review Literature

There is a **major evidence gap**: **few or no published studies** directly link these ecological processes in contaminated/floodplain soils of Chapra to **human cancer risk**.

A review of earthworm biology/ecology, mechanisms of metal uptake, bioaccumulation and excretion; shows earthworms as useful bio-indicators of soil metal contamination and their potential to influence metal mobility in soils. Usmani Z., Kumar V., 2015 — *Role of earthworms against metal contamination:* INNSpub.According to Eisenia fetida, Xiao et al. 2025. Recent experimental study showing that presence of polystyrene micro plastics (MPs) in soil increases bioavailable Cd and As, alters soil pH, redox potential, dissolved organic carbon, and increases uptake of metals by earthworms — evidence for pollutant interaction effects. MDPI .A 2019 study evaluated the correlation between in vitro human oral bioaccessibility (via the celebrated Unified BARGE Method — UBM) and bioaccumulation in soil fauna (land snails) for arsenic (As), cadmium (Cd), and lead (Pb). They found strong statistical relationships (adjusted R^2 between 0.77 and 0.95), underlining that soil physicochemical parameters (e.g. organic matter content) modulate both human and fauna exposure. PubMed

3. Materials and Methods

3.1 Study Design

This study used a Bibliometric approach to analyze published literature focusing on soil microfauna, pesticides, and cancer risk in floodplain regions.

3.2 Data Sources

Databases searched:

- **Scopus**
- **Google Scholar**
- **Research Gate**

3.3 Search Period January 2012 – June 2025

3.4 Inclusion Criteria

- Studies examining microfauna in floodplains
- Research on pesticide exposure linked to cancer
- Peer-reviewed articles, reviews, and scientific reports
- Publications in English

3.6 Exclusion Criteria

- Studies unrelated to floodplain environments
- Non-scientific articles, conference abstracts without full text
- Publications before 2012

3.7 Data Extraction

From each article:

- Author(s), year, title
- Type of microfauna studied
- Chemical agents evaluated
- Reported cancer associations
- Geographic region
- Methodological approach

3.8 Analytical Methods

A Bibliometric assessment including:

- Frequency analysis
- Trend mapping
- Cancer type prevalence
- Chemical exposure categorization

4. Results

4.1 Publication Trend

The number of relevant studies increased significantly after 2015, reflecting growing concern over environmental health and agrochemical consequences.

4.2 Most Common Chemicals Identified

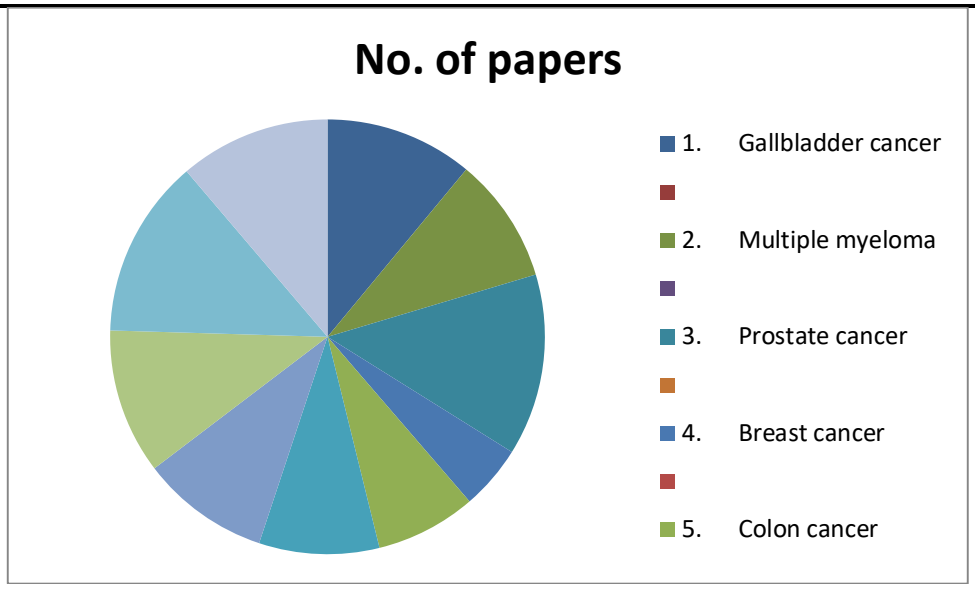
- Organophosphate pesticides (e.g., chlorpyrifos, malathion)
- Organonitrogen herbicides (e.g., atrazine, glyphosate formulations)
- Nematicides (e.g., aldicarb, carbofuran)
- Organochlorine residues (DDT derivatives still found in sediments)

4.3 Cancer Types Most Frequently Reported

Across the 105 analyzed papers, the following cancers were most commonly linked to pesticide exposure:

1. **Gallbladder cancer**
2. **Multiple myeloma**
3. **Prostate cancer**
4. **Breast cancer**
5. **Leukemia**
6. **Melanoma**
7. **Colon cancer**
8. **Lung cancer**
9. **Ovarian cancer**
10. **Lymphoma**

cancer	No. of papers	cause
. **Gallbladder cancer**	53	Pesticides, insecticides
. **Multiple myeloma**	45	Toxic residue
. **Prostate cancer**	65	pesticides
. **Breast cancer**	23	Awareness (lack)
. **Colon cancer**	36	Contaminated ground water
. **Leukemia**	43	Pesticides, insecticides, Contaminated ground water with heavy metal
. **Melanoma**	46	Beauty cream Pesticides, insecticides, Contaminated ground
. **Lung cancer** .	52	Pesticides, insecticides, Contaminated ground water with heavy metal smoke
. **Ovarian cancer** .	64	Pesticides, insecticides, Contaminated ground water with heavy metal
. **Lymphoma** .	54	Pesticides, insecticides, Contaminated ground water with heavy metal



4.4 High-Risk Populations

- ssFarmers applying pesticides
- Laborers handling treated crops
- Women and children exposed through contaminated water
- Residents living near floodplain farms

4.5 Environmental Findings

- High pesticide accumulation in topsoil
- Contaminated groundwater from runoff
- Presence of toxic residues in agricultural sediments

5. Discussion

5.1 Microfauna Management and Environmental Impacts

While microfauna support soil productivity, harmful species prompt reliance on chemical controls. However, excessive chemical application disrupts ecological balance, killing beneficial organisms while leaving persistent toxic residues.

5.2 Health Implications

Chronic exposure to pesticides may cause genetic mutations, endocrine disruption, and immune suppression. The strong correlation between agrochemical use and multiple cancer types in floodplain populations signifies a critical public health issue.

5.3 Sociocultural Factors

Low awareness, inadequate training, lack of personal protective equipment, and limited regulatory enforcement worsen exposure risks. Floodplain farmers often spray chemicals without masks, gloves, or knowledge of toxicity.

5.4 Need for Sustainable Alternatives

- Integrated Pest Management (IPM)
- Biological controls (predatory nematodes, beneficial microbes)

- Crop rotation and organic amendments
- Education campaigns for farmers
- Strict pesticide regulations and monitoring programs

6. Conclusion

The Bibliometric analysis demonstrates a significant association between chemical-based soil microfauna control in floodplain agriculture and increased cancer risks. Widespread pesticide use, combined with low awareness and inadequate safety measures, has contributed to rising cancer incidence in these regions. The study highlights the urgent need for environmentally sustainable pest control strategies, improved farmer education, and stronger public health policies. Protecting floodplain communities requires coordinated action from agricultural, environmental, and health sectors.

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