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A Silent Epidemic in Black Gram: How Climate Drives Powdery Mildew Outbreaks

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A Silent Epidemic in Black Gram: Climate-Driven Powdery Mildew Outbreaks in Karnataka

Black gram (*Vigna mungo*), often referred to as the "poor man's meat," is an essential pulse crop in India, valued for its high protein content and role in sustainable agriculture (Sharma et al., 2019). Despite its importance, the crop is increasingly threatened by powdery mildew caused by *Erysiphe polygoni*, a disease that has emerged as a major constraint to productivity in recent years (Srivastava and Singh, 2020).

The Disease That Silently Reduces Yield

Powdery mildew appears as white powdery growth on leaves, interfering with photosynthesis and weakening plant vigor. Under severe infection, it can cause yield losses ranging from 40 to 90 per cent, depending on crop stage and disease onset (Balol et al., 2020). Unlike many soil-borne diseases, powdery mildew is an obligate aerial pathogen, thriving under specific environmental conditions rather than soil factors (Agrios, 2005; Palti, 1988). This makes its behavior highly dependent on climate.

What Farmers Are Seeing in the Field

Field observations across northern Karnataka show that powdery mildew is not uniform—it behaves differently from place to place. Some areas experience only mild infection, while others face severe outbreaks. Districts like **Gadag and Dharwad are emerging as major hotspots**, where the disease is more intense. In contrast, regions such as Belgaum and Haveri generally show lower levels of infection. This uneven distribution tells an important story: **the disease is not random—it is shaped by local conditions**.

Climate: The Real Game Changer

The most important factor influencing powdery mildew is climate. Areas with certain weather conditions consistently show higher disease levels than others. In particular, drier agro-climatic zones tend to experience **much higher disease pressure** compared to transition zones. This is because powdery mildew fungi grow rapidly under moderate temperatures and favorable humidity (Glawe, 2008; Korra and Kumar, 2020).

In simple terms:

Where the climate suits the pathogen, the disease becomes severe

This explains why the same crop behaves differently across regions, even when farmers follow similar practices.

What About Soil and Irrigation?

Many farmers assume that soil type or irrigation may strongly influence disease. However, field observations suggest otherwise.

- Soil type shows almost no difference in disease levels

- Irrigation may slightly increase disease, but its effect is limited

This is because powdery mildew is mainly an air-borne disease, controlled more by weather than by soil conditions (Agrios, 2005).

A Complex Disease Environment

The survey also revealed frequent occurrence of other diseases such as:

- Cercospora leaf spot
- Anthracnose
- Leaf crinkle
- Alternaria leaf spot

Such multi-disease interactions are common in pulse ecosystems and can complicate disease management strategies (Maheshwari et al., 2021).

Implications for Disease Management

The findings strongly suggest that uniform disease management practices are ineffective. Instead, farmers and researchers must adopt:

- Region-specific strategies based on agro-climatic zones
- Timely monitoring of disease hotspots
- Selection of tolerant varieties (e.g., DU 1 showing relatively lower severity)
- Climate-informed crop management practices

Integrated approaches combining these strategies are essential for effective disease control (Patel et al., 2021).

What This Means for Farmers

The key lesson from these findings is clear:

A single, uniform control method will not work everywhere

Instead, farmers need:

- Region-specific disease management strategies
- Awareness of local disease hotspots
- Selection of tolerant varieties where possible
- Timely monitoring based on weather conditions

Managing powdery mildew is not just about spraying chemicals—it is about understanding when and where the disease will occur.

Looking Ahead

As climate patterns continue to change, diseases like powdery mildew are likely to become more unpredictable. This makes it even more important to shift toward **climate-aware crop management.** By understanding how environmental factors influence disease, farmers and researchers can work together to develop more effective and sustainable solutions.

Conclusion

This study clearly establishes that powdery mildew in black gram is a climate-driven disease, with agro-climatic conditions playing the most decisive role in its development. While management practices contribute to variation, their impact is secondary to environmental factors. With increasing climate variability, understanding these disease–environment relationships is crucial. Identifying hotspot regions and adopting targeted, climate-adapted strategies will be key to reducing losses and ensuring sustainable black gram production.

References

1. Agrios, G. N. 2005. *Plant pathology*. 5th ed. Elsevier Academic Press, San Diego, CA.
2. Balol, G., Math, G., Mogali, S., Kumbar, B., and Revadi, N. 2020. Chemical management of powdery mildew caused by *Erysiphe polygoni* DC. on blackgram and its economic analysis. *International Journal of Chemical Studies* 8(6): 256–259.
3. Glawe, D. A. 2008. The powdery mildews: A review of the world's most familiar (yet poorly known) plant pathogens. *Annual Review of Phytopathology* 46: 27–51.

4. Korra, T., and Kumar, V. M. 2020. Epidemiological studies on powdery mildew of black gram and its relationship with weather parameters. *International Journal of Current Microbiology and Applied Sciences* 9: 949–956.
5. Maheshwari, S., Gupta, P. K., and Singh, R. 2021. Epidemiology and integrated management of powdery mildew in pulse crops under Indian conditions. *Journal of Food Legumes* 34: 45–52.
6. Sharma, R., and Singh, B. 2019. Evaluation of fungicides for effective management of powdery mildew in mungbean and urdbean. *Legume Research* 42(3): 394–398.
7. Srivastava, J. N., and Singh, A. K. 2020. *Diseases of field crops: Diagnosis and management, Vol. 2*. CRC Press, Boca Raton, FL.