
NEFM: Nikhil's Expansion Force Model
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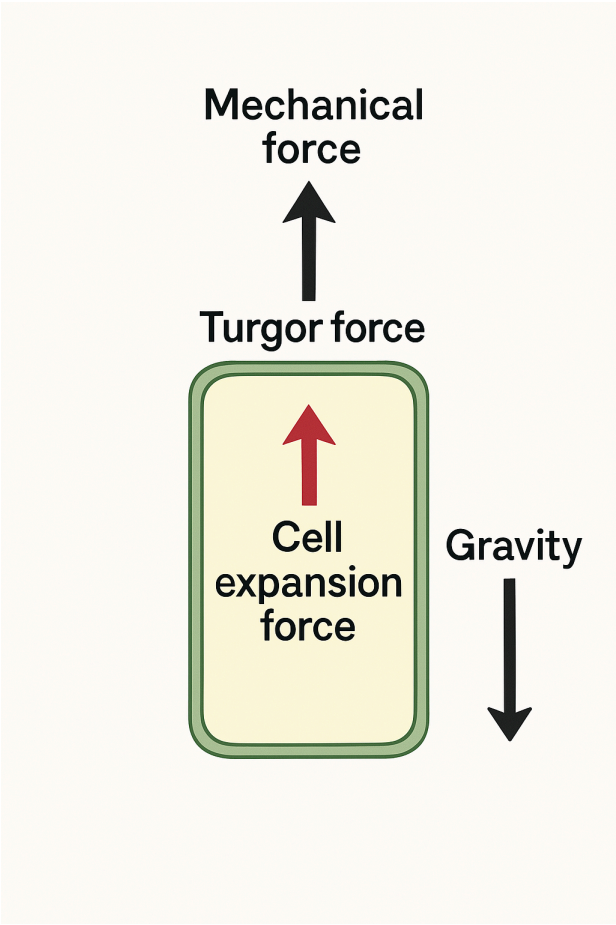
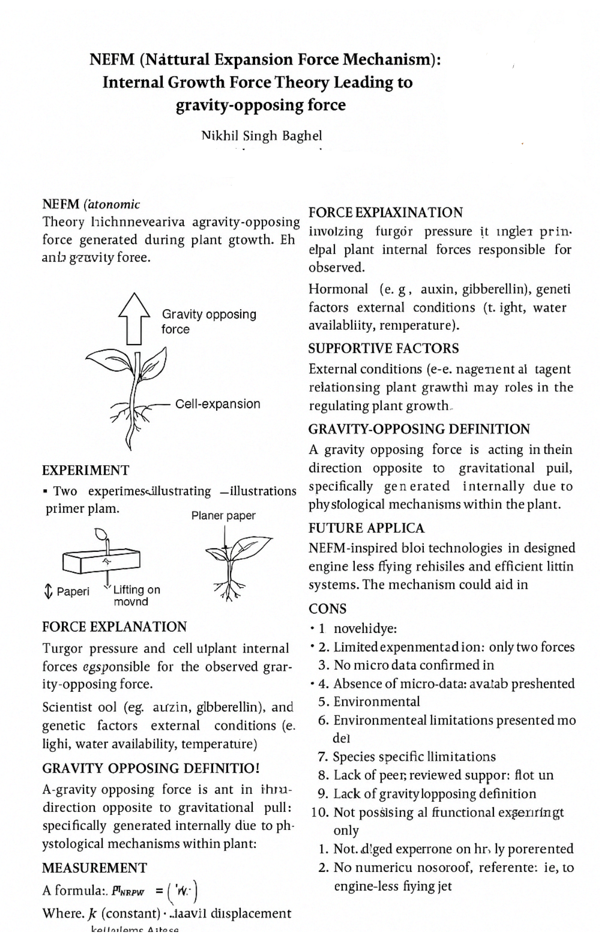

Mechanical force
Turgor force
Cell expansion force
Gravity



NEFM (Náttural Expansion Force Mechanism): Internal Growth Force Theory Leading to gravity-opposing force

Nikhil Singh Baghel

NEFM (átonomic

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EXPERIMENT

- Two experimes illustrating —illustrations primer plam.

FORCE EXPLANATION

Turgor pressure and cell ulplant internal forces egsponsible for the observed grar-ity-opposing force.

Scientist ool (eg. aurzin, glbberellin), and genetic factors external conditions (e. lighi, water availability, temperature)

GRAVITY OPPOSING DEFINITIO!

A-gravity opposing force is ant in ihru-direction opposite to gravitational pull: specifically generated internally due to ph-ystological mechanisms within plant:

MEASUREMENT

A formula:. P_{NRPW} = ('W:)

Where. k (constant) · ..laavil diisplacement

FORCE EXPIAXINATION

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Hormonal (e. g, auxin, gibberellin), geneti factors external conditions (t. ight, water availabliity, remperature).

SUPFORTIVE FACTORS

External conditions (e-e. nagerent al tagent relationsing plant grawthi may roles in the regulating plant growth.

GRAVITY-OPPOSING DEFINITION

A gravity opposing force is acting in thein direction opposite to gravitational puil, specifically gen erated internally due to physiological mechanisms within the plant.

FUTURE APPLICA

NEFM-inspired bloi technologies in designed engine less ffying rehisiles and efficient littin systems. The mechanism could aid in

CONS

- 1 novehidye:
- 2. Limited expenmentad ion: only two forces
- 3. No micro data confirmed in
- 4. Absence of micro-data: avatab preshented
- 5. Environmental
- 6. Environmenteal limitations presented mo del
- 7. Species specific llimitations
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- 9. Lack of gravitylopposing definition
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Abstract

NEFM (Nikhil's Expansion Force Model) is a novel theory proposing a new mechanism to explain vertical plant growth through internal biomechanical forces. It introduces a conceptual force called Plant Growth Force (PGF), which is generated by the combined action of turgor pressure and cellexpansion force. This internal force enables upward expansion by working against gravitational pull, without the need for external mechanical support. NEFM provides a fresh perspective on plant physiology and opens the door to futuristic gravity-opposing technologies.

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1. Introduction

Traditional models of plant growth primarily focus on cellular division and turgor pressure. However, these explanations do not fully account for how plants achieve consistent vertical growth against gravity. NEFM proposes that plant cells generate an internal mechanical force—PGF—which drives vertical expansion. Unlike the term "anti-gravity," NEFM uses the scientifically accurate term "gravity-opposing force" to describe PGF.

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2. Core Concept and Formula

The core idea of NEFM is that vertical plant growth is powered by an internal mechanical force:
Let:

P = Turgor Pressure (N/m²)

E = cell expansion force
Then:
PGF = P × E

This internal force, PGF, acts upward and is responsible for pushing the plant against gravity.

Proposed Unit:
A new unit for PGF is defined as 1 Nikhil:
1 Nikhil = 1 (N/m²) × elasticity co

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3. PGF as a Gravity-Opposing Force

Rather than calling the mechanism "anti-gravity," NEFM defines PGF as a force that opposes gravity by generating an upward expansion. It acts like a natural lifting system within plant tissues. The force arises only when favorable biological conditions are met, such as adequate water for turgor pressure and extensible cell walls.

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4. Favorable Conditions Required for PGF

The PGF is only valid and functional when the following essential conditions are fulfilled:

Sufficient Turgor Pressure (via water intake)

Cell wall elasticity and flexibility

Adequate light and temperature

Availability of nutrients and minerals in soil

Functional growth hormones (e.g., auxins)

Genetic growth potential of the plant

Different plants may require different specific environmental and internal conditions. The experimenter must confirm that these criteria are satisfied.

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5. Supporting Experiments (Tissue Paper, Coin, Foil)

To demonstrate the mechanical nature of internal expansion, three simple analog experiments were designed:

Tissue Paper: Shows upward lift from within

Coin: Demonstrates gravity counteraction

Foil: Shows flexible surface expansion

These experiments are symbolic and meant to help visualize how internal forces can produce upward movement without external support.

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6. Lighting Force and Mechanical Stress Contribution to Plant Growth

In addition to turgor pressure and cell expansion, light plays a pivotal role in accelerating vertical plant growth. Lighting force refers to the influence of external light stimuli on plant cells, affecting both mechanical expansion and internal pressure. Light enhances cellular activity and growth by influencing cellular respiration and promoting turgor pressure within plant cells. This synergistic effect, when combined with mechanical stress from cell expansion, accelerates plant growth by increasing the rate of cellular division and expansion.

Together, turgor pressure, cell expansion, and lighting force form a triad of growth-enhancing factors, opening up possibilities for regulating and optimizing plant growth more effectively for agricultural and bioengineering applications.

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7. Applications of PGF and NEFM

Gravity-opposing jet propulsion systems

Biological lifting tools

Energy-free elevator systems

Engine-less flying objects

Inspiration for anti-gravity technology

Advanced plant-based robotics and growth studies

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8. Future Research and Units

Define NEFM-based units and formulas for simulation

Extend NEFM to lateral and creeping plant structures

Include hormonal and gene expression control in advanced versions

Utilize PGF in biomimetic designs and medical tools

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9. Acknowledgment

I am an independent student researcher from Raipur, Chhattisgarh, India. I thank the open scientific community for encouraging young minds to share their theories and observations.

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10. Challenges and Possible Criticisms (with Solutions)

Lack of microscopic data:
Solution: Collaborate with labs in future research.

No direct measurement tool for PGF:
Solution: Propose indirect testing via cell deformation studies.

Limited species analysis:
Solution: Apply NEFM to various plant types.

Simplified unit (Nikhil):
Solution: Calibrate through future studies.

Skepticism toward gravity-opposing claim:
Solution: Clarify it as "internal mechanical force."

Potential confusion with anti-gravity:
Solution: Emphasize terminology.

No genetic correlation yet:
Solution: Expand theory in future versions.

Basic diagrams only:
Solution: Upgrade with microscopic and 3D visuals.

Lack of citations:
Solution: Add references during peer collaboration.

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11. Conclusion

NEFM (Nikhil's Expansion Force Model) presents a powerful new perspective on vertical plant growth as an internally generated mechanical phenomenon. PGF (Plant Growth Force), defined as P × E, could be a stepping stone toward future gravity-opposing technologies and innovations in bioengineering. If this theory proves successful through further studies, it could revolutionize not just botany but aerospace and structural engineering fields.

"The combined effect of turgor pressure and cell expansion, driven by mechanical force, plays a crucial role in plant growth. This growth is further influenced by an external 'lighting force' that

affects the cellular environment. The application of both mechanical forces and lighting forces results in a synergistic effect that enhances vertical growth in plants. Specifically, turgor pressure and cell expansion contribute to the mechanical stress within plant tissues, which, when coupled with external light stimuli, accelerates cellular activity and growth. By controlling and optimizing these forces, it is possible to regulate plant growth more effectively, opening possibilities for advanced agricultural techniques and potential applications in bioengineering. The role of light as an additional force—affecting both mechanical expansion and internal pressure—suggests a new dimension of plant growth regulation, making it possible to design growth-enhancing conditions for different plant types."

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