SPECIES IN NEWS

Alfalfa (Lucerne)

- **Botanical Identity**: Commonly known as **Alfalfa** or **Lucerne**, this leguminous crop is a key component of forage-based farming systems globally.
- **Name Origin**: The name “alfalfa” is derived from the Arabic word **"al-fasfasa"**, which means "**the best forage**," reflecting its high agronomic value.

Nutritional and Agricultural Value

- **Fodder Quality**: Alfalfa is considered **one of the richest sources of livestock fodder**.
    - Contains **high levels of crude protein** (up to 20%),
    - Rich in **calcium, potassium, and vitamins A, D, E, and K**,
    - Enhances **milk yield and weight gain** in animals due to its digestibility and palatability.
- **Crop Utility**: Grown as a **multi-cut perennial fodder crop**, providing **3–4 harvests annually** under good agronomic practices.

Edible Perennials

THE PFAF DATABASE

Alfalfa, Lucerne | Medicago sativa

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Role in Nitrogen Fixation

- **Symbiotic Relationship**: Alfalfa roots form nodules in association with **Rhizobium meliloti (Sinorhizobium meliloti)**.
- **Biological Nitrogen Fixation**:
    - Atmospheric nitrogen (**N_2**) is converted into **plant-usable ammonia (NH_3)**,
    - Reduces **external dependence on synthetic nitrogen fertilizers**,
    - Improves **soil health** over multiple cropping cycles.

Contribution to Sustainable Agriculture

- **Green Manure Function**: Alfalfa contributes to **soil organic matter enrichment** when used as **green manure**.
- **Microbial Biodiversity**: Its root systems promote **beneficial microbial life** in the rhizosphere.
- **Carbon Sequestration**:
    - Deep-rooted structure enables **carbon storage in sub-soils**,
    - Helps mitigate **climate change effects** by reducing atmospheric CO_2.
- **Erosion Control**: Dense canopy reduces **topsoil erosion**, particularly on slopes.

Genetically Modified (GM) Alfalfa

- **Purpose of Genetic Modification**:
    - Develop **herbicide-tolerant** varieties (e.g., glyphosate-resistant GM alfalfa),
    - Improve **drought or salinity tolerance** in response to climate stresses,
    - Enhance **biomass production and nutritive content**.
- **Examples of GM Traits**:
    - Similar to GM crops like **Bt Cotton**, **GM Maize**, and **GM Soybean**, GM Alfalfa is engineered for **productivity and input efficiency**.

Global and Indian Context

- **Global Cultivation**: Widely cultivated in **USA, Canada, Europe, and Australia** for animal husbandry.
- **India's Status**:
    - Alfalfa (Lucerne) is cultivated in **Gujarat, Rajasthan, Punjab**, and **parts of Maharashtra**,
    - **No GM Alfalfa** is commercially approved in India as of now, due to **biosafety and regulatory concerns**.