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Plows moving parallel to a horizontal plane

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Annotation. Plowing is one of the oldest and most essential agricultural practices, designed to prepare the soil for planting by turning it over, breaking it up, and burying crop residues. While traditional plowing often involves angled blades that cut into the soil, a specialized technique — plows moving parallel to a horizontal plane — offers unique advantages in modern farming.

Keywords: plow, tillage, soil cultivation, agricultural machinery, soil fertility, parallel horizontal movement, modern farming, conservation tillage, GPS-guided systems, sustainable agriculture.

Аннотация. Вспашка — один из древнейших и важнейших методов ведения сельского хозяйства, предназначенный для подготовки почвы к посеву путём её переворачивания, рыхления и заделывания пожнивных остатков. В то время как традиционная вспашка часто предполагает использование наклонных лемехов, которые врезаются в почву, специализированный метод — плуг, движущийся параллельно горизонтальной плоскости, — предлагает уникальные преимущества в современном сельском хозяйстве.

Ключевые слова: плуг, вспашка, обработка почвы, сельскохозяйственная техника, плодородие почвы, движение параллельно горизонтальной плоскости, современное земледелие, почвозащитная обработка, GPS-навигация, устойчивое сельское хозяйство.

Annotatsiya. Shudgorlash qishloq xo‘jaligidagi eng qadimiy va eng muhim agrotexnik tadbirlardan biri bo‘lib, tuproqni ag‘darish, yumshatish hamda o‘simlik qoldiqlarini ko‘mish orqali uni ekishga tayyorlash uchun xizmat qiladi. An’anaviy shudgorlashda odatda tuproqqa ma’lum burchak ostida kirib boruvchi lemex va ag‘dargichlardan foydalaniladi. Biroq zamonaviy dehqonchilikda gorizontal tekislikka parallel harakatlanuvchi pluglar deb ataladigan maxsus texnologiya o‘ziga xos afzalliklarni taqdim etadi.

Kalit so‘zlar: plug, shudgorlash, tuproqqa ishlov berish, qishloq xo‘jaligi texnikasi, tuproq unumdorligi, gorizontal tekislikka parallel harakat, zamonaviy dehqonchilik, konservatsion ishlov berish, GPS boshqaruvi, barqaror qishloq xo‘jaligi.

Plows have been a cornerstone of agricultural development for thousands of years. From ancient wooden tools to modern mechanized equipment, plowing remains essential for preparing soil, improving crop yields, and supporting sustainable farming practices [1].

A plow is a farming implement used to turn over and loosen soil before planting crops. It breaks up compacted earth, buries crop residues, and helps control weeds. Plowing improves soil aeration and water infiltration, creating an ideal environment for seed germination and root growth.

There are several types of plows, each designed for specific soil conditions and farming needs:

Plow Type	Description
Moldboard Plow	Turns over the soil completely, burying weeds and residues.
Chisel Plow	Loosens soil without turning it over, preserving organic matter.
Disc Plow	Uses concave discs to cut and mix soil, ideal for hard or rocky terrain.

[1] Tojiddin Juraev and others, ‘Constructive Geometric Modeling the Double Sided Moldboard Bodies for Bidirectional Rotary Plows’, 2024, p. 030018, doi:10.1063/5.0181766.

Subsoiler	Breaks up deep soil layers to improve drainage and root penetration.
Rotary Plow	Uses rotating blades to churn soil, often used in small-scale farming.

Plowing plays a vital role in:

- **Soil preparation**: Ensures a smooth, fertile seedbed.
- **Weed control**: Buries unwanted plants and disrupts their growth.
- **Moisture retention**: Enhances water absorption and reduces runoff.
- **Nutrient cycling**: Mixes organic matter into the soil for better fertility[2].

Today's plows are equipped with advanced technologies:

- **GPS-guided systems** for precise field coverage.
- **Hydraulic depth control** for consistent soil penetration.
- **Sensor-based feedback** to monitor soil conditions in real time.

These innovations help farmers reduce fuel consumption, minimize soil erosion, and optimize productivity.

Modern agriculture emphasizes conservation tillage, where plowing is done with minimal soil disturbance. Techniques like strip-till and no-till farming use specialized plows to protect soil structure and biodiversity.

Conclusion

Plows are more than just tools—they're a symbol of agricultural progress. Whether used in traditional farming or high-tech operations, plows continue to shape the future of food production by supporting healthy soils and sustainable practices.

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