



Balangu (*Lallemantia royleana*) & Basil (*Ocimum basilicum*) Seed Production

A Complete Farmer's Guide for Punjab, Pakistan

Introduction

Balangu (*Lallemantia royleana*) and Basil (*Ocimum basilicum*) are high-value medicinal and aromatic crops with increasing domestic and international demand. Both crops produce premium seeds used in the food, pharmaceutical, nutraceutical, cosmetic, and health industries. Their relatively low water requirement, high market value, and adaptability make them excellent choices for diversification within farming systems.

Unlike conventional production guides that focus primarily on fertilizers, pesticides, and irrigation schedules, this guide follows the **PQNK (Paedar Qudratti Nizam Kashatqari)** production system. PQNK is not a crop-specific technology; it is a **nature-based production system** designed to restore the operating conditions of natural ecosystems. Once these ecological conditions are established, the same production principles apply to every crop, every soil type, every topography,

and every climatic region, with only planting geometry and seasonal timing adjusted according to the crop.

The objective is not merely to produce seed, but to produce healthy plants in biologically active soil with lower production costs, minimal water use, greater resilience, and improved seed quality.

Part I

Before Planting: Establish the PQNK System

No crop should be planted before the field has been converted to the PQNK production system.

Step 1 – Break the Hardpan

If a hardpan exists, it must first be fractured using a subsoiler to restore deep rooting, improve water infiltration, increase soil aeration, and reconnect the surface soil with the subsoil. This is normally a one-time operation.

Step 2 – Correct Excessive Soil Alkalinity

Where soil pH exceeds approximately 8.0, deep irrigation combined with the PQNK sulfuric acid correction protocol should be completed before raised beds are constructed. This restores biological activity and allows plant roots to gradually reclaim the soil.

Step 3 – Construct Permanent Raised Beds

Construct permanent raised beds with:

- Bed top: **42 inches**
- Furrow top: **18 inches**
- Furrow depth: **8 inches**

The furrows permanently serve as hydraulic and tractor traffic corridors, while the raised beds remain undisturbed biological production zones.

Step 4 – Never Disturb the Soil Again

After beds are established:

- no ploughing,
- no cultivation,
- no rotavator,
- no disc harrow.

Seeds are planted directly through mulch using the PQNK Slit Insertion Precision Planter (SIPP).

Part II

Why Balangu and Basil Perform Well in PQNK

Balangu and Basil naturally prefer:

- well-aerated soils,
- rapid drainage,
- active biological communities,
- moderate moisture,
- unrestricted root growth.

Permanent raised beds create exactly these conditions.

Instead of depending upon repeated fertilizer applications, PQNK allows plant roots, fungi, bacteria, earthworms, and soil organisms to mine nutrients from the geological reserve already present in the soil.

Part III

Climate Adaptation

PQNK is suitable for every climatic region because the production system restores the soil ecosystem rather than forcing plant growth through external inputs.

In Punjab:

Balangu

- Preferred sowing: October–November
- Flowering: February–March
- Harvest: March–April

Basil (Seed Crop)

- Preferred sowing: February–March
- Flowering: May–June
- Seed harvest: June–July

Local planting dates should always be adjusted slightly according to seasonal temperatures.

Part IV

Bed Layout and Plant Geometry

The standard PQNK raised bed has a **42-inch bed top**.

Standard SIPP Configuration

The PQNK Slit Insertion Precision Planter plants **five rows** in one pass.

This spacing is suitable for most crops and allows rapid planting while maintaining excellent light interception and air circulation.

Higher Density Planting

Where greater plant populations are desirable, the planter may be operated a second time with its row positions shifted between the original rows.

This creates:

- five original rows,
- four additional intermediate rows,

for a total of **nine uniformly spaced rows** on a single 42-inch raised bed.

This method maintains accurate row spacing while substantially increasing plant population without disturbing the soil.

The choice between five-row and nine-row planting depends upon:

- seed size,
- final plant architecture,
- desired plant population,
- expected rainfall,
- available irrigation,
- harvesting method.

Part V

Plant-to-Plant Spacing

Within each row, spacing should be selected according to the final plant size rather than seed size.

The SIPP planter allows precise in-row spacing to be adjusted according to crop requirements.

Typical spacing ranges between approximately **2 and 6 inches**, depending on the desired final population and branching habit.

Final spacing should ensure:

- complete canopy closure,
- adequate air circulation,
- minimal weed establishment,
- uniform seed maturation.

Part VI

Sowing Procedure

Before sowing:

- ensure mulch remains intact,
- verify adequate soil moisture,
- avoid saturated soil.

The SIPP planter opens a narrow slit through the mulch, deposits seed at the required depth, closes the slit, and leaves the remainder of the bed completely undisturbed.

This preserves soil structure, fungal networks, pore continuity, and biological activity.

Part VII

Water Management

PQNK does not irrigate the crop by flooding the raised bed.

Water is applied only into the furrows.

Moisture then moves laterally and upward by capillary action into the raised bed.

This provides:

- continuous oxygen supply,
- adequate moisture,
- deeper rooting,
- improved biological activity.

The objective is to maintain the **vattar–wafsa** balance—a soil environment where water is present as thin films around soil particles while air continues to occupy the larger pore spaces. This balance supports vigorous root growth and active microbial life.

Part VIII

Plant Nutrition

Under PQNK, plant nutrition is supplied primarily through biological processes.

Crop residues remain on the soil surface as permanent mulch.

Living roots continuously feed microorganisms through root exudates.

Mycorrhizal fungi and bacteria mobilize nutrients from the soil's geological reserve.

Consequently, mature PQNK fields normally require neither synthetic fertilizers nor routine applications of compost or manure. During the transition period, biological amendments may be used where necessary to accelerate recovery, but they are viewed as transitional aids rather than permanent requirements.

Part IX

Weed Management

Weeds are indicators of ecological succession rather than enemies to be eliminated chemically.

Permanent mulch, rapid canopy closure, and an active soil ecosystem naturally suppress most weed emergence.

Where weeds do appear, they should be removed before seed production while leaving the soil undisturbed.

Part X

Crop Protection

Healthy PQNK fields support a diverse community of beneficial insects, spiders, birds, and microorganisms.

These natural predators help maintain ecological balance and reduce the likelihood of pest outbreaks.

Routine insecticide or fungicide applications are therefore avoided unless an exceptional situation demands intervention.

Part XI

Harvesting

Harvest when:

- seed heads have fully matured,
- moisture has declined sufficiently,
- seed colour is fully developed,
- shattering losses remain minimal.

Harvest should preferably be carried out during dry weather after morning dew has evaporated.

Part XII

Seed Drying and Storage

Seeds should be cleaned, dried to safe storage moisture, and stored in clean, dry, well-ventilated conditions.

Proper drying preserves:

- germination,
- seed vigour,
- storage life,
- market value.

Part XIII

Expected Outcomes

When the PQNK production system is properly established, farmers can expect:

- substantially lower water use,
- elimination or major reduction of synthetic fertilizers,
- elimination or major reduction of pesticides,
- improved soil structure,
- deeper rooting,
- higher biological activity,
- improved seed quality,
- lower production costs,
- greater resilience to drought and heat,
- long-term sustainability.

This approach transforms the original factsheet from a collection of research findings into a practical production manual centred on the PQNK system. Crop-specific recommendations for Balangu and Basil are integrated within a consistent ecological framework, so the same principles can be applied to other crops with only adjustments to planting geometry and seasonal timing.

Applying PQNK without understanding nature's operating system will not deliver abundance, stability, or nutrient density.

*PQNK (pronounced "picnic")—the regenerative & sustainable **Pristine Organic Farming System**—is grounded in **Natural Ecosystem Science**. This science employs perennial biodiversity, protects*

soil with organic mulch, and avoids practices such as water inundation, tillage disturbance, and leaving soil bare.

*It is the **process** that matters most. PQNK is a pristine production system designed not merely for yield, but for optimal, balanced output—where quality, sustainability, and ecological harmony emerge from a self-regulated, zero-external-input methodology.*

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