



Buckwheat (*Fagopyrum esculentum*) - A multipurpose cover crop for hilly regions

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Buckwheat is a fast growing short-duration cover crop. It establishes, blooms and ready for incorporation within 35 to 40 days after sowing and its residue decomposes quickly. As a grain, it reaches maturity in just 70 to 90 days. Buckwheat suppresses weeds and attracts beneficial insects and pollinators with its abundant blossoms. It is easy to kill and reportedly mobilizes soil phosphorus from soil better than other cover crops. Buckwheat thrives well in cool and moist conditions but it is not frost tolerant. Buckwheat is not a drought tolerant crop and readily wilts under hot and dry conditions.

Buckwheat is neither a cereal crop nor related to the wheat. It is, in fact, a dicotyledonous plant but treated in a similar way like any other common cereal grains.

Binomially, it belongs within the family of *Polygonaceae*. The plant reaches about 45-60 cm in height with branches and bears pink or white flowers in clusters that attract honeybees depending on the cultivar type. Each buckwheat seed features three sides pyramidal shape, brown to gray in colour with a thick outer hull. Inside, its seed-kernel is cream white and has a nutty flavour.

Buckwheat as food: Buckwheat crop was first cultivated in the high plains of south-eastern China and Himalayas centuries ago where it was a staple food of the inhabitants much before rice and other cereal grains which had gradually replaced its cultivation. Its grains, indeed, provided much needed essential nutrients, protein, fats and minerals to the local inhabitants during early civilization times, enabling them thrive well under inhospitable terrains. Lately, a renewed interest is growing with respect to its revival as mainstream crop among the food and nutrition

scientists.

Common buckwheat, much similar to quinoa (*Chenopodium quinoa*), is not a novel food item as one may think but just an ancient crop. The plant is cultivated as annual flowering herb. It is a short-season crop which grows well even under less than optimum soil conditions.



Buckwheat's well-balanced starch, protein, fat and mineral composition has found a renewed interest, particularly among the food scientists. Additionally, its seeds compose proportionately more starch and less fat content than fellow oil seeds, hence, can be handled in a similar way like any other staple grains. Being a short-season crop and sustainable characteristic of thriving under drought

conditions, it can be an answer for malnutrition alleviation programmes, particularly in famine-prone regions.

Buckwheat for soil and environment health:

Quick cover: Few cover crops establish as rapidly and as easily as buckwheat. Its rounded pyramid-shaped seeds germinate in just three to five days. Leaves upto 3 inches wide can develop within two weeks to create a relatively dense with soil shading canopy. Buckwheat typically produces 2 to 3 tons of dry matter per acre in just six to eight weeks. Buckwheat residue also decomposes quickly, releasing nutrients to the next crop.

Weed suppressor: Buckwheat has strong weed-suppressing ability and it gives smothering effect on warm-season annual weeds. Planting of buckwheat after intensive tillage would suppress even perennial weeds. A mix of tillage and successive dense seedlings of buckwheat can effectively suppress Creeping Thistle (*Cirsium*

arvensis), sowthistle, (*Sonchus* sp.) Field Bindweed, (*Convolvulus arvensis*), leafy spurge (*Euphorbia esula*), Russian knapweed (*Rhaponticum repens*) and peppergrass (*Lepidium latifolium*). It is remarkably effective against couch grass (*Elymus repens*). Apart from shading and competition effect, the living buckwheat may have an allelopathic effect for weed control.

Soil improvement: Buckwheat produces about 1.5 tons/acre dry matter and takes up about 12 kg of nitrogen (N). Buckwheat has a tissue content of about 1.2% N. Buckwheat is often called a phosphorus (P) “scavenger” because it can take up soil P more efficiently than other plants. Buckwheat solubilizes and takes up phosphorus that is otherwise unavailable to crops and then releases these nutrients to later crops as the residue breaks down. The roots of the plants produce mild acids that release nutrients from the soil. In its growing stage, the roots of buckwheat exude substances that help to solubilise P that may otherwise be unavailable to plants. The roots of buckwheat were also found to have a high storage capacity for inorganic P. As a result, when buckwheat plants are incorporated in the soil, they decay quickly, making phosphorus and other nutrients available to the succeeding crop. These acids also activate slow-releasing and organic fertilizers, such as rock phosphate. Buckwheat’s dense, fibrous roots cluster in the top 10 inches of soil, providing a large root surface area for nutrient uptake. Incorporating buckwheat into the soil improves soil health by enhancing the soil structure of the topsoil, making it more friable, improving its tilth, and increasing the water infiltration rate. The incorporation of organic matter in its residues also encourages the formation of beneficial soil microbes. An abundant growth of fine roots at surface layer of soil keeps the top soil loose and friable just only with minimum tillage hence it maintains a good soil condition for the successive crops. Buckwheat performs better than cereal grains on low-fertility soils and soils with high levels of decaying organic matter. Buckwheat is planted in low fertile soil to rejuvenate its fertility. However, buckwheat does grow well in compacted, droughty, or excessively wet soils.

Quick regrowth: Buckwheat will regrow after mowing at the stage it reaches 25 per cent bloom. It also can be lightly tilled after the midpoint of its long flowering period

to reseed a second crop. Some growers bring new land into production by raising three successive buckwheat crops with the above method.

Bio-control of insect pests: Flowering of buckwheat plant may start within three weeks of planting and continue for upto 10 weeks. Its shallow white blossoms attract beneficial insects that attack or parasitize aphids, mites, and other pests. These beneficial include hover flies (*Syrphidae*), predatory wasps, minute pirate bugs, insidious flower bugs, tachinid flies and lady beetles.

Management of buckwheat: Buckwheat prefers light to medium, well-drained soils: sandy loams, loams and silt loams. It performs poorly on heavy, wet soils or soils with high levels of limestone. Buckwheat grows best in cool, moist conditions; but is not frost-tolerant. It is also not drought tolerant. In extreme afternoon heat will cause

wilting of plants, but, mostly plants recover overnight time.

Cultivation/establishment: Buckwheat may be planted just after winter season. In untilled, minimally-tilled or clean-tilled soils, sow 25 to 50 kg/ac of seeds at 0.5 to 1.5 inches deep at 6 to 8 inch rows. In case of dry condition, higher rate of seeds may be used for overall vigour. An average require seed rate of 44 kg/ac can be used for

quicker canopy development on especially weed or droughty ground. Overall vigour is usually better in drilled seeding than broadcast once. In broadcasting, seeds are spread uniformly on firm seedbed and incorporate with an implement that presses the seed and soil together lightly, rather than fluff it. Buckwheat compensates for lower seeding rates by developing more branches per plant and more seeds per blossom. However, reduced seed rate favours poor stand of crop which may allow weed competition until the canopy develops. Using cleaned and small sized seeds with good germination percentage can lower the cultivation costs; when the denser crop mature, stalks become spindly and are more likely to lodge from wind or heavy rain.

Crop rotations: Buckwheat is used most commonly as a cover crop to suppress weeds and replace bare fallow. It is often planted throughout year in Udhagamandalam condition except December to February month. Generally after harvest of early vegetable crops, then followed by a



Winter vegetable, cool-season cover crop. In many areas, it can be planted following harvest of winter crops. buckwheat grows and flowers between the killing of winter annual legume cover crops in spring and their re-establishment in winter.

Pest management: Few pests or diseases affect buckwheat. It's most serious weed competitors are often small grains from preceding crops, which only add to the cover crop biomass. Grass weeds, lambs quarters, goosefoot (*Chenopodium album*) and pigweed (*Amaranthus palmeri*) can be a problem to some level. Poor population of buckwheat are not effective for cover crops goals, gap filling has to be done as soon as the problem is discovered. Diseases include a leaf spot caused by the fungus *Ramularia* and *Rhizoctonia* root rot.

Other options: Buckwheat can be grown as an emergency cover crop to protect soil and suppress weeds when the main crop fails or cannot be planted in time due to unfavourable conditions. Buckwheat can be raised for grain if planted by mid-July or by early August. That timing allows double cropping after early vegetables in many locations. It requires a two-month period of relatively cool, moist conditions to prevent blasting of the blossoms.

Buckwheat can become a weed if allowed to go to seed and that happens earlier than most realize. Kill about 10 days after flowering begins. Earlier, the stubble tends to regrow; later the first seeds mature and germinate. Earliest maturing seed can shatter before plants finish

blooming. Some seed may become dormant. Insects are rarely a problem; buckwheat can harbour some insect pests. Buckwheat also supports the growth of root lesion nematodes (*Pratylnchus penetrans*).

Comparative notes:

– Perhaps buckwheat has only about half the root mass as a per cent of total biomass as small grains. Its succulent stems break down quickly, leaving soils loose and vulnerable to erosion, particularly after tillage.

– Plant a soil-holding crop as soon as possible. Buckwheat is nearly three times as effective as barley in extracting phosphorus and more than 10 times more effective than rye, the poorest P scavenger of the cereal grains. As a cash crop, buckwheat uses only half as much soil moisture as soybeans.



Significant note:

– Buckwheat can produce 2 to 3 tons of dry plant material per acre, and can be broadcast or drilled.

– Buckwheat flowers attract a wide diversity of beneficial insects including pollinators. Because buckwheat can be planted in advance of an income-producing crop, beneficial can become established before they are needed

– **Cover crop type:** summer or cool-season annual broadleaf grain

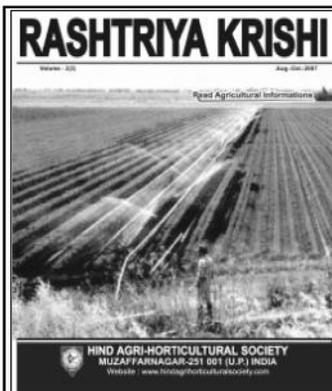
– **Major roles:** quick soil cover, weed suppressor, nectar for pollinators and beneficial insects, topsoil loosener, rejuvenator for low-fertility soils.

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