

First Report on Buckwheat (*Fagopyrum esculentum*) from High Altitude Temperate Zone of North Western Himalayan Region

R. A. SHAH

ABSTRACT

Buckwheat (*Fagopyrum esculentum*) is one of the important unattended crops cultivated in the pockets of the high altitude temperate zones of North West Himalayan region. Due to the less economic output and cultivation constraints the crop is at the verge of extinction though it is of high medicinal and nutritive value. The present study is an attempt to explore the status of buckwheat in the pockets of North West Kupwara district of Jammu & Kashmir. The study brings in the various causes of the decrease in acreage under buckwheat and the various possible remedies to be evolved to review its production for the sustenance of the farming families affiliated with it.

Keywords: Buckwheat, Himalayan region, Medicinal and nutritive value, Extinction

INTRODUCTION

Buckwheat (*Fagopyrum esculentum*) belonging to the family Polygonaceae is a moisture loving, cool-climate, annual cereal crop. It is a native of Central Asia, cultivated in China and other Eastern countries as a bread-corn. Buckwheat is a pseudo cereal. It produces edible seeds used as a cereal grain, though the plant does not belong to the family Poaceae (Ahmad and Raj 2012). The fruit is an achene with a single seed inside a hard outer hull, which is dark brown or black in colour. The seed coat is green or tan, which darkens the buckwheat flour. Since buckwheat was once a staple food of high altitude temperate zones of Jammu & Kashmir viz., Ladakh, Baderwah, Gurez, Keran and Machil. Now the acreage under this crop is drastically reduced to a few cultivation pockets and is at the verge of its extinction. Keeping in view the study was conducted to assess the past and present status of this valuable agricultural landrace.

including 1651 sq. km. of forest area, wrapped by the Pirpanchal and Shanbarimountain ranges accompanied by snow clad peaks and dense verdant forests. Its northern and western borders form the line of control between India and Pakistan, and the eastern and southern borders touch Sopore, Bandipore, and Baramulla Tehsils (Fig. 1). There are three bad pocket areas, namely, Machil, Keran and Karnah, located near L.O.C which remains land locked for more than six months in a year. Machil and Keranis located around the famous river Kishan



Fig. 1: Map of Kupwara district
(Source:Kupwara.nic.in)

MATERIALS AND METHODS

Kupwara district is located between 34.17 to 34.21 North Latitude and 73.10 to 73.16 East Longitude on extreme north-west of Kashmir valley, spread on an area of 2379 square kilometers

Ganga which separates Pakistan occupied Kashmir and Jammu & Kashmir. The survey on the identification and utilization pattern underexplored Buckwheat was conducted in Machil and Keran valleys of the district Kupwara. Five villages from Machil (Machil, Pushwari, Dappal, Chontiwari, Duddi) and Keran (Kundian, Mundian, Pathro, Farkin, Bitchwal) zones of Kupwara district were purposively selected and the investigations were made through multiple field visits, questionnaires and interviews with elderly people regarding the past and present status of buckwheat cultivation.

RESULTS AND DISCUSSION

The details of the present investigation carried out to study the status of buckwheat in high altitude zones of North Western Himalayas is presented hereunder.

Importance of Buckwheat in the study area

Since cropping season of the studied area is of short duration due to early prolonged winter and early snowfall. The crops like maize, paddy, etc, do not mature in time resulting in drastic yield reduction. It becomes necessary for the farming community of the areas to rely on the cultivation of buckwheat, which is of short duration crop (2–3 months), and fits well in the high Altitude Temperate zone. Although it is less productive than other grain crops, it is particularly adapted to very poor, badly-tilled land which can produce scarcely anything else (Fig. 2). It is one of the quickest growing cover crops taking only 4–5 weeks from seeding to flowering thus suppresses weeds and prevent soil erosion due to intensive runoff. Young leaves are eaten as vegetable and the stalks is an important source of cattle feed. Since it matures quickly, it escapes early autumn frost injury. It is also a good green manure crop and improves soil



Fig. 2: Buckwheat in Machil

texture, and also increase nutrient status of the soil, particularly phosphorus and micronutrients in the root zone, which is beneficial for the succeeding potato crop (the only cash crop from study area) in a rotation.

Buckwheat flour is unsuitable for bread making owing to its non-sticky character of its protein thereby consumed in the special preparation locally known as *Seer* and also used to make pancakes particularly during the winter months, which is highly palatable. The common belief of these tribal communities is that *Seer* keeps them warm during chilly winter months. It is also reported that Buckwheat is of high nutritive and medicinal value as the seed contains high crude protein content (18%), with biological values above 90% (Eggum *et al.* 1981), containing a high concentration of all essential amino acids, especially lysine, threonine, tryptophan and the sulphur-containing amino acids (Bonafaccia *et al.* 2003). Buckwheat is very rich in trace elements (for example Zn, Cu, Mn and Se), however, it must be grown in unpolluted areas, to avoid accumulation of contaminating elements. Different milling fractions may contain different minerals and proteins, dark flours being generally richer than the light ones (Ikeda and Yamashita, 1994; Kreft *et al.*, 1996). Buckwheat is also reportedly grown traditionally in relatively warmer areas of both Leh and Kargil districts of Ladakh, where double-cropping is possible (Ahmad and Raj 2012).

Traditional cultural practices

Buckwheat is grown in a traditional way and the special cultural practices have been developed by these ethnic communities as per their requirements.

- Soil*: it is grown in well manured and drained soils of the study area.
- Soil preparation*: Soil is prepared by local plough giving two to three ploughings followed by levelling.
- Manuring*: Crop is pure organic and is cultivated on the sole application of Farm yard manure, blind application (as per availability) of which is done during soil preparation.
- Sowing*: Sowing is done by broadcasting method during second fortnight of April using one five (5) quintals of seed per hectare.
- Weed control*: Due to blanket application of seed rate and high germination value of buckwheat the soil is early covered by the crop resulting in weed growth suppression as such weed control

is not required in the said crop due to natural weed management.

- f. *Irrigation*: The crop is grown as rainfed and is not irrigated by any artificial means.
- g. *Crop protection measures*: Due to its hardy nature, the crop is devoid of any major insect/pest attack, except in some negligible cases where it is attacked by wild animals (monkey).
- h. *Harvesting and threshing*: The crop matures in about three months and is harvested soon after around 80% of its foliage turns brownish in colour and the grain contains minimum moisture content which is detected by thumb method. Threshing is done manually by bullocks on a threshing floor/ beating of the stacks on the wooden log.
- i. *Yield*: 16 to 20 quintals per hectare

Constraints

Low benefit cost ratio of buckwheat

- a. Since the crop is of very short duration, solely cultivated on organic manures, the proper spacing between the plants is not maintained, exhausted seed is used and lack of improved agronomic practices results in reduction in grain yield, short growing season and dwarf crop geometry results in reduced biological yield.
- b. The soil is prepared by bullocks which is costly and increased labour charges during post harvesting management results in high cost of cultivation.

Change of Staple food

- a. Since the land holdings are minimised due to population growth and year by year constructions, the farming community uses the small holdings for kitchen gardening and fodder maize cultivation for their livestock which is the backbone of their economy/ livelihood security.
- b. Government keeps buffer stock of rice and wheat flour at their outlets on special subsidized rates for these far flung areas which has almost eliminated the necessity of growing buckwheat by the farming community.
- c. High sensitivity to climate, changing food habits, increasing demand of land for fodder and wheat, and growing competition with newer crops in the region like French beans, turnip and green peas as the second crop. Very low temperature reduces germination, favours male sterility and reduced seed set

Strategies

- 1 Laying of demonstration plots in the buckwheat growing areas is the need to set the improved agronomic practices for the crop to increase the yield at the reduced cost of cultivation
- 2 The new and improved farm tools and machinery is to be developed to reduce the drudgery faced during Buckwheat cultivation and decrease labour charges during post harvesting management which otherwise results in high cost of cultivation.
- 3 New and improved varieties need to be developed and tested against the prevailing climatic conditions along with maintaining and conserving the traditional vulnerable gene pool.
- 4 Special schemes should be launched in such tribal areas to attract the farming community for the cultivation of buckwheat.
- 5 The nutritive value and medicinal value of buckwheat is to be popularised.
- 6 Post harvest technology of the buckwheat id to be developed through value addition.

CONCLUSIONS

The unexplored nutritional quality and medicinal value of buckwheat has not yet received the attention as it deserves by the researchers and policy makers. A dire and urgent need lies in reviving its cultivation and management through necessary programmes and policies for enhancing its scope and thereby securing the national food security interests and the livelihood of the farming community affiliated with it.

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