

Chapter 3

Job's tears (*Coix lacryma-jobi*): a medicinal plant of India

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Abstract: Job's tear (*Coix lacryma-jobi*) is a cereal and medicinal crop belonging to the Poaceae family. The former is used as food (e.g., porridge, coffee, wine) and as medicine to treat diseases such as wounds, blisters, and urinary tract infections, while the latter is used to make decorations (e.g., earrings, bracelets, rosaries, handbags, curtains). Job's tears are also considered nutritious and can be used as a reliable supplement or replacement for rice, which is a staple diet for many people around the world. Keeping this in view, an attempt has been made to document the medicinal, food, nutraceutical, and pharmacological uses through field and literature surveys. Photographs are provided for easy identification in the field.

Keywords: *Coix*, poaceae, medicinal uses, food values, economic values

Introduction: Poaceae is one of the large and almost ubiquitous family of monocot flowering plants known as grasses. The Poaceae include cereal grasses, bamboo as well as grasses of natural meadows and arable land (lawns) and pastures. The grasses have stems that are hollow except for the nodes and narrow, alternate leaves that grow in two rows. The underside of each leaf encloses the stem and forms a leaf sheath. With about 780 genera and around 12,000 species, Poaceae is the fifth largest plant family, after Asteraceae, Orchidaceae, Fabaceae and Rubiaceae (Christenhusz and Byng 2016). Among these the genus *Coix* Linn. is derived from the works of Theophrastus. Name of Job's tears, coix, comes from the Greek koix, meaning "palm". The *Coix* was originated in North-eastern hill tracts of India and Myanmar, because the great variability of the wild type of *C. lacryma-jobi* and *C. aquatica* occurs in this region. It is cultivated in the north-eastern parts of India, China, Philippines, Burma, Sri Lanka, and some other Asian countries (Hore and Rath 2007). *Coix lacryma-jobi* L., is an annual or perennial herb with thick and tall stems, commonly known as Bodhi pearl, millet, pearl rice, medicinal corn, *Coix* pearl, etc. It is an important grass species with medicinal and nutritional functions, along with economic value and is widely distributed in tropical and subtropical regions of Africa worldwide (Feng et

al. 2020). The whole *Coix* plant and its seeds pod are commonly known as Job's Tears. The seed pod often has a tear drop appearance. It is a small herbaceous plant. The seeds of *Coix lacryma-jobi* L. are used as a source of food. A popular use is in the making of rosaries, as the beads are particularly resistant to moisture damage and carry the precious symbolism of tears (Patel et al. 2017). In India, the leaves are used as fodder, especially for Elephant. In southern India, Job's tears have been cultivated for at least 4000 years. The seeds are commonly found in archaeological sites. The grass is often growing in rice fields nearby. The grass is considered a weed in commercial rice fields (Patel et al. 2017).

Description: *Coix lacryma-jobi* is a small herbaceous plant which grows up to 3 m high. The leaf sheaths are glabrous and the leaf blades are narrowly lanceolate, measuring about 20-50 cm long and 1.5-4 cm wide. The midrib is prominent. The flowers are monoecious, both male and female flowers can be found on the same plant. Fruit is tear-shaped 8 mm by 1.1 cm, with glossy berries which turn black upon maturity. The tear drop shaped seeds have a hard shiny coat with a hole at the tip where the flower emerges. The seeds are used for beads and other decorative purposes. Some selected strains are cultivated for their edible grains. It is in leaf from May to October. Flowering period is from July to October, and the seeds ripen from September to November (Saxena and Brahmam 1996; Figure1-3).

Medicinal Uses: *Coix lacryma-jobi* is a Chinese traditional medicinal crop, which has many medical effects. Dishes prepared from the seeds of *Coix lacryma-jobi* are sweet in taste and cold in nature, and have the effects of strengthening spleen and dampness, clearing heat and detoxification, beautifying and beautifying. *Coix lacryma-jobi* seeds could treat pulmonary edema, wet pleurisy, chronic gastrointestinal disease, chronic ulcer, dysuria, and other diseases. According to traditional Chinese medicine, *Coix* seeds had the function of promoting dampness and diuresis, clearing heat and removing pus, tonifying spleen, stopping diarrhea and eliminating dampness (Gu 1990; Pang et al. 1996). Early medicine studies showed that *Coix* seed had antipyretic, analgesic and sedative effects, and has an exciting effect on isolated heart, intestine and uterus, etc. It was reported that *Coix* seed oil contained odd carbon chain fatty acids with strong anticancer activity, which had significant inhibitory effect on tumor growth. *Coix* rice is also a kind of food of improving one's looks, which can keep the skin lustrous and delicate. It can eliminate acne, freckles, senile plaque, pregnancy spots and butterfly spots, which has good curative effect on hemorrhoids, and rough skin (Yao 2005; Feng et al. 2020). *C. lacryma-jobi* is utilized in the treatment of common gastrointestinal symptoms including diarrhoea and dysentery. The seeds are the most frequently used part to be used. Seeds are given for enteritis and persistent diarrhoea in children.



Figure 1: *Coix lacryma-jobi* in wild at Jamtara, Jharkhand

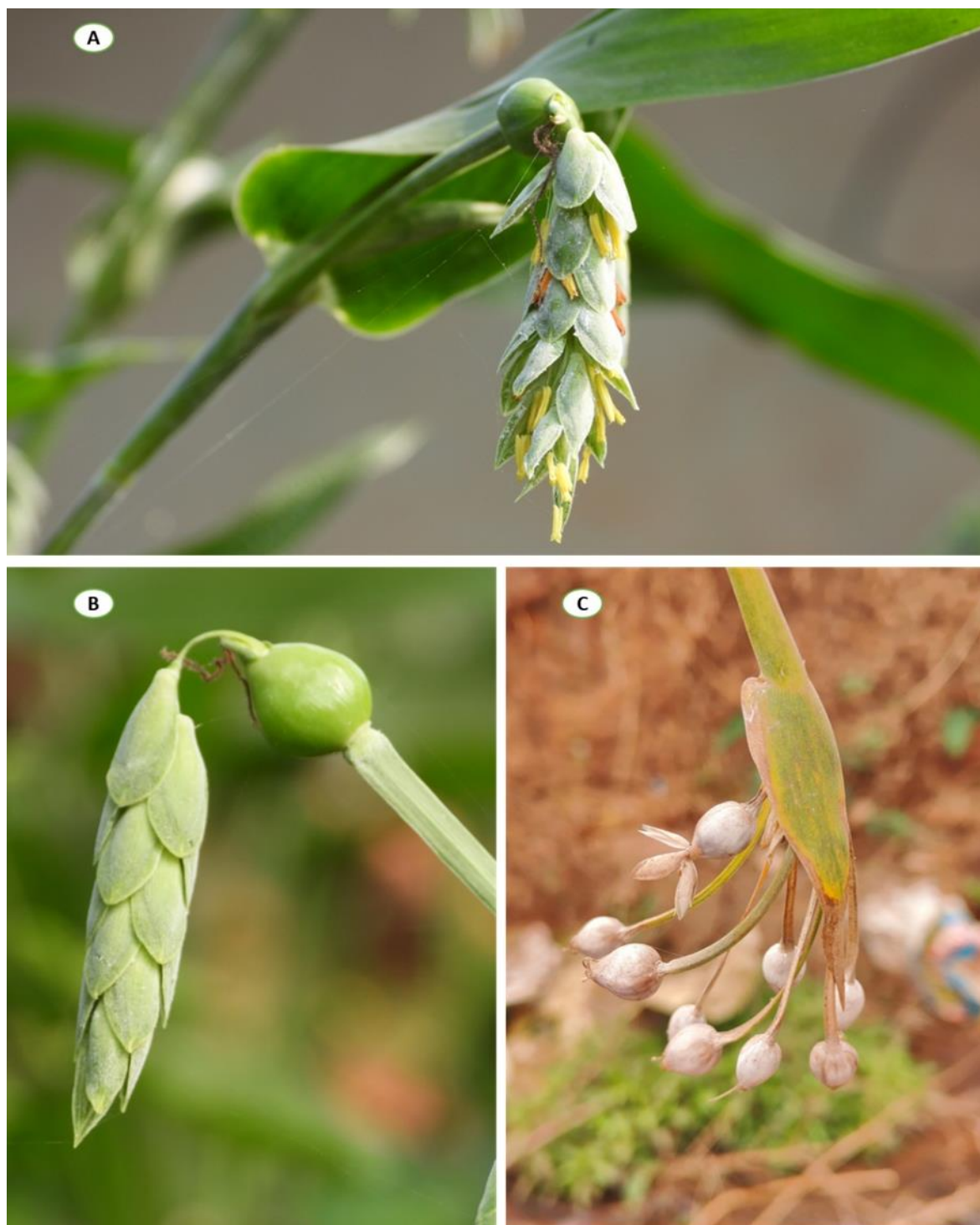


Figure 2: Vegetative parts of *Coix lacryma-jobi* A) Flowers, B) Young seed, C) Dried seeds



Figure 3: Dried seeds of *Coix lacryma-jobi*

It has also been used in the treatment of acute appendicitis. The seeds again are vermifuge and is used to treat worms' infestation while the roots are specifically given for ascariasis. A decoction of *C. lacryma-jobi* is believed to be beneficial for the breath. The seeds are used in the treatment of various pulmonary conditions amongst them includes bronchitis, pleurisy, pneumonia, pulmonary abscess, hydrothorax, and lung cancer. Infusion of the seed is prescribed for bronchitis, pulmonary abscess, and hydrothorax. The seeds and roots of *C. lacryma-jobi* has diuretic properties used in the treatment of urinary complaints (Koh et al. 2009). The traditional practitioners recognized its anti-inflammatory and antibacterial properties and utilized them in the treatment of infective processes like appendicitis, tuberculosis, gonorrhoea, leucorrhoea, puerperal fever and as mentioned above in both pulmonary and urinary tract infections. The fruits are given for intestinal and lung cancers, cervical and chorionic epithelioma and viral skin affections like warts, verruca plana and eczema. The roots are used in the treatment of fever with drying of saliva and intense thirst, oedema, beri-beri, amenorrhoea and jaundice (Feng et al. 2020; Devaraj et al. 2020).

Food values: Jobs Tears (*Coix lacryma-jobi* L.) is native to Southeast Asia and has long been cultivated in China and India for its nutrient content. It is one of the promising local food resources with high nutritional and medicinal values. This is a cereal-based plant with high carbohydrate content and rich in other nutritional values as well. Due to its health-promoting ingredients, Jobs' tear seeds can be considered as a nutraceutical. The seeds have been used to make a variety of products (Feng et al. 2020). After peeling and cleaning, the ripe seeds are boiled and eaten with cooked rice. Ground flour is also sometimes mixed with water and consumed as a refreshing drink, for example ice water or flour. Raw grains are used as peanuts. Job's tear is used by the Garo, Karbi and Naga tribes to make beer from crushed grains. In China, it is used as a traditional medicine and a complementary medicinal food. In Thailand, the shell is removed and the seeds are eaten whole. The seeds are also boiled with water to make a drink which is available in the market as an alternative healthy food (Kutschera and Krasaekoopt 2012). In China, which can be used to make porridge, rice, and various pastas for people to eat. Though potential food applications include addition in soups, popular dessert made by adding jobs tears mixed with sugar and coconut milk in Thailand, fermented grains are used in making beer and wine. Western culture use coix to bake as biscuits, hulling the grains for better edibility. Coix flour (30%) formulated with wheat flour is optimal for preparation of bread and biscuits. China people consume coix as soup; Japanese make coix seeds into buttermilk-like and cider-like flavored liquid called “Dzu” (Devaraj et al. 2020).

Nutritional values: With the food values Job's tears has also nutritional values. Reportedly contains thiamine, riboflavin, niacin, and ascorbic acid. It contains 10.83% moisture, 13.05g protein, 5.45g fat, 68.60 g of carbohydrates, 0.36 g of fiber and 1.3 g of ash and flour from Job's tears contained 2.25% amylase. The main protein is coixin, rich in proline and leucine but low in lysine (Chhabra and Gupta 2015). Coix rice contains vitamin B1, vitamin B2, vitamin E, niacin, fiber and other nutrients. It is also a kind of green food that is high in protein, medium fat, medium sweet and high in zinc. Many studies have shown that Coix rice contains not only a large amount of protein, but also many types of amino acids necessary for the human body. *Coix lacryma jobi* seeds contain 8 kinds of amino acids necessary for the human body, and their proportion is very close to the needs of the human body. At the same time, they are more easily absorbed and utilized by the body than rice. The calcium content of *Coix* seeds has also been reported to be higher than that of other seeds. Because *Coix* rice contains rich nutrients and high calories, it can support metabolism and reduce the burden on the digestive tract. Therefore, it is an excellent restorative food for patients and infirm people (Zhang et al. 2002; Agriculture-Cereal Foods 2020).

Pharmacological values: A range of phytoconstituents, such as polysaccharides, proteins, oils, phytosterols, phenols, flavonoids, lignans, lactum, policosanols, and vitamins, are found in different parts of coix such as whole seeds, hulls, bran, endosperm, and testa (Devaraj et al. 2020). Beneficial effects of Job's tears include reducing fat accumulation in the liver, protecting against carcinogenic compounds, protecting against viral infections, reducing allergic reactions, reducing cardiovascular and heart disease, atherosclerosis, and reducing osteoporosis (Zeng et al. 2022). Further biomedical benefits of this grain include antiproliferative and chemo preventive effects on lung cancer, antitumor, antiallergic, inducing embryotoxicity and fibrinolytic activities, improving the lipid metabolism. The pharmacological activity of *Coix* plants are Diuretic, Anti- rheumatic, Antispasmodic, Anti-inflammatory, Antidiarrheal, Anthelmintic, Antipyretic, Antispasmodic, Diuretic, Hypoglycaemic, Anti-Cancer and Tonic (Hore and Rath 2007). *Coix* has anti-inflammatory, antihistamine, and many other effects, including inhibition of frog muscle contraction, a sedative effect in mice and rabbits, and a reduction in normal body temperature and experimental fever in rats (Patel et al. 2017).

Economic values: It should be noted that cultivated type stiffening roots are very durable and can also be made into twine or binding material. The villagers proved that the seeds of wild species are used to make various types of decorations: rosaries, earrings, curtains, bracelets, photo frames (Lirio et al. 2013). Many Asian markets sell them as grain for cooking. Beaders and crafts people also use grains and they may be found at beading and

craft stores. This grass is also cultivated as ornamentals, incidentally and Western gardeners may not be aware that large grains on these grasses are perfectly edible (Kumar et al. 2017).

Conclusion: *Coix lacryma-jobi* has significant medicinal value to humans. The seeds are a rich source of nutrients and justify the food status. It contains proteins, oils, phytosterols, phenols, flavonoids, lignans, lactum, policosanols, and vitamins and are traditionally used in the treatment of diuretic, antirheumatic, antispasmodic, anti-inflammatory, antidiarrheal, anthelmintic, antipyretic, antispasmodic, diuretic, hypoglycemic and anticancer drugs. Need more research to evaluate and determine the use of this grass in aspects of medicinal, nutraceutical and pharmacological values.

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