ECHO Asia Seed Fact Sheet

Scientific name – *Coix lacryma-jobi*

English common name – Job's tears

Asian common names – (from Multilingual Multiscript Plant Name Database http://www.plantnames.unimelb.edu. au/Sorting/Coix.html#lacrimajobi) -

- Chinese: chuan gu, chuan gu gen (medicinal name), ye mi ren, ye yi ren, ye yi mi, shan yi mi, hui hui mi
- Japanese: juzudama
- Khmer: skuöyLaotian: düay
- Malay: jelai batu, jelai pulut, menjelai, jali (Indonesia), jali betul (Indonesia), jali watu (Indonesia), rumput jelai
- Thai: duai, maduai

Photo: ECHO Asia staff

Variety –

- **Mekong mix**

General description and special characteristics – Job's tears is an annual, erect grass, 1-2 m tall, with maize-like brace roots that grow from the lower nodes. The grass is monoecious, having separate male and female flowers on different parts of the plant. The female flowers produce yellow, purple or brown seeds; often tear-shaped (hence the name). Soft-shelled varieties are eaten (*Coix lacryma-jobi var. ma-yuen*) and hard-shelled varieties (*Coix lacryma-jobi var. stenocarpa* and *var. monilifer*) are often used as ornamental beads (FAO, 1995).

Crop uses (culinary) – According to PROSEA's *Coix lacryma-jobi* website, a 100 g edible portion of the husked grain of Job's tears contains: 10.1-15.0 g water, 9.1-23.0 g protein, 0.5-6.1 g fat, 58.3-77.2 g carbohydrates, and 0.3-8.4 g fiber (1996). The energy value is about 1500 kJ/100 g. Despite its minor crop status, Job's tears is a nutritious grain, containing more fat and protein than rice and wheat. Both sticky and non-glutinous varieties are grown throughout much of South and Southeast Asia, as well as parts of China. Job's tears is consumed in various ways, including in soups, beverages, and desserts, and steamed like rice. Although dough can be made exclusively from steamed Job's tears, this flour will not rise because of the absence of gluten. A recommended mixture for bakery purposes, then, is 70 percent wheat flour and 30 percent Job's tears flour (PROSEA, 1996). Job's tears is also fermented into beer. Anthropologist Dr. Malcolm Cairns reports that although the crop is rapidly disappearing from the upland fields of the Angami Nagas in northeast India, Job's tears was traditionally grown by the Naga farmers to be fermented, and also for use in snacks and tea.

Crops uses (livestock production) – Naga farmers also used Job's tears as pig and chicken feed. As a locally-sourced animal feed, Job's tears is used ground, broken, or as a whole grain. PROSEA reports that Job's tears flour can replace maize flour in poultry feed (1996). For forage purposes, the FAO's *Coix lacryma-jobi L.* Grassland Species Profiles web page states that Job's tears green material is very palatable. The site also offers forage nutritional information for fresh, early vegetative Job's tears growth in India: 29.9 percent dry matter, 8.5 percent crude protein, 27.9 percent crude fiber, 2.7 percent ether extract and 51.9 percent nitrogen-free extract. The FAO reports that in India, Job's tears forage yields about 13.9 tons of green material per hectare (6.1 non-metric tons/acre). The Indian Grassland and Fodder Research Institute offers a few forage varieties of Job's tears, including 'Bidhan Coix 1'. This variety is reportedly suitable for cultivation in West Bengal, Orissa, Assam, and north Bihar with an average green fodder yield of 34.6t/ha (15.22 non-metric tons/acre) and a dry matter yield of 6.9 t/ha (3.04 non-metric tons/acre). Several cuts of Job's tears fodder per year are possible.

Crop uses (medicinal) – In addition to agricultural and nutritional applications, Job's tears has also been used in traditional Chinese and Indian medicine. The grain contains kanglaite, a neutral lipid extract from the endosperm, which has been endorsed as a treatment for lung, liver, stomach and breast cancers by the Chinese government. Medicinally beneficial compounds in Job's tears' seeds which have anti-tumor properties include: coixenolide, palmitic acid, stearic acid, oleic acid and linoleic acid (Waraluck, et al., 2011).

Other uses - The hard, inedible seeds of the non-grain varieties (*Coix lacryma-jobi* var. *stenocarpa* and var. *monilifer*) are often employed as beads that are sewn onto garments and used for rosaries.

Seasons of production – Job's tears grows best when planted at the beginning of the rainy season.

Length of production and harvest period – Seeds germinate in one to two weeks. The plant grows vegetatively for at least four months before flowering and pollination occur. Grain filling takes another two months. The stalk begins to dry when most of the seeds are mature.

Pollination – Job's tears' flowers are monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and are pollinated by wind. Both self pollination and cross pollination are possible with the latter usually being predominant.

Plant spacing - Hills should be spaced approximately 30 cm (12 in.) apart in rows 40-80 cm (16-32 in.) apart with a seeding rate of 7-15 kg/ha (6.2-13.4 lb./acre).

Production methods – According to PROSEAS's *Coix lacryma-jobi* website, seeds should be pre-treated before planting with a fungicide, or by submerging seeds in hot water (60-70°C / 140-158°F) for about 10 minutes to control smut fungus (*Ustilago coicis*). Then the crop can be established by dibbling seeds about 5 cm (2 in.) deep into prepared fields at the beginning of the rainy season. Propagation by cuttings is reportedly possible, especially for fodder production; however, no details were provided.

Environmental conditions for production – PROSEA describes Job's tears as a quantitative short-day plant (i.e. it undergoes accelerated flowering under short-day conditions, but will flower under either long- or short-day conditions) that requires high temperatures, abundant rainfall and reasonably fertile soils (1996). In the tropics, the plant can occur up to 2000 m (6561 ft.) altitude. While intolerant of drought, Job's tears will grow in flooded conditions. Wild stands are often found in wet areas along streams and ditches. Dr. Lory Lirio, a Job's tears researcher from the Phillipines, states that in exposed, swampy areas, wild stands regenerate themselves through tillers and seeds.

Soil requirements – Job's tears requires a fertile soil for optimal growth. In poor soils, fruit is often hollow.

Pests – The most serious disease of Job's tears is smut (*Ustilago coicis*), which destroys the ovaries. Smut can severely damage crops and therefore seed treatment with fungicide or hot water (60-70C) for at least 10 minutes before sowing is recommended. Another important disease of Job's tears is leaf blight (*Bipolaris coicis*). Control measures include burning crop residues, spraying fungicides, and the use of more resistant cultivars. Tar leaf spot (*Phyllachora coicis*), rust (*Puccinia operata*) and *Ustilago lachrymae-jobi* are some other diseases known to attack Job's tears.

Seed saving – The stalk begins to dry when most of the seeds are mature. After threshing and husking the grain (either manually or with the same tools used for rice), it is dried for storage. Under humid conditions, the grain does not store well, although the whole grain reportedly stores better than the husked grain (PROSEA, 1996).

References -

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