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Male meiotic investigation in *Zanthoxylum armatum* Roxb.

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SUMMARY

One of the genus of *Zanthoxylum i.e. Z. armatum* Roxb. is a plant highly used for medicinal as well as religious purposes by the Hindus in Northern India. The other species found are *Z. planispinum, Z. alatum subtrifoliolatum e*tc. *Zanthoxylum* is also known as winged prickly ash, tejbal, timroo and Nepali dhania.The plant is found in the hot valleys of Himalaya from 600 to 1800 m. In the present work the genera was explored for detailed male meiotic analysis. The male flowering material was collected from the Kotbanglow, Uttarkashi. The material was fixed in Carnoy's fluid II (6 absolute alcohol: 3 Chloroform: 1 Glacial acetic acid). The smearing and squashing was done in 1% aceto-orcein. The genus was explored cytogenetically using parameters like chromosome configuration at metaphase I/diakinesis, chiasmata/chromosome frequency, number of spores/tetrad, pollen size and pollen sterility. The number of bivalents were observed to be 33 (2n = 66). High amount of asynchrony (stages from metaphase I to telophase II) was observed within the same anther. The chiasmata/cell and chiasmata/chromosome were observed to be 61.2 % and 0.93 %, respectively. Meiotic anomaly like retarded movement of chromosomes and chromatids were also observed in about 10 % PMCs (Pollen mother cells). The spore arrangement was found to be tetrahedral (four spores per PMCs), monads (single spore per PMCs), dyads (two spores per PMCs), heptads (seven spores per PMCs) and polyads (more then seven spores per PMCs). The mean number of pollen per anther was found to be varied from 1200-3200. The mean pollen diameter was found in a range of 10 -16 µm and the pollen sterility was found to be 13 %.

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Key words : Asynchrony, 33 bivalents, Metaphase I/diakinesis, Retarded movement, Sterile pollen grains

The genus *Zanthoxylum* is distributed worldwide from tropical to temperate zones. There are over 200 species from small shrubs to large trees. It has some other synonyms as *Z. planispinum, Z. alatum subtrifoliolatum* (French.), etc. It is known as winged prickly ash, tejbal, tejphal, timroo timber or Nepali dhaniya. It is widely distributed throughout the warmer region of the world, extending into temperate region of Europe, Asia and Australia. About 50 species among 20 genera are reported from India. Out of which 9 species are classed as commercial timbers (Pearson and Brown, 1932). The range of the plant is from Eastern Asia –China to the Himalayas. *Zanthoxylum* is recognized as having medicinal qualities for curing stomachache, toothache, intestinal worms, rheumatism, scabies, snakebites, fever, cholera and used as a flavouring agent or spice for preparation of certain traditional dishes. During winter, a soup made from the dried fruit (locally known as hag) is consumed by the entire family to keep warm in winter. A chutney (like a sauce), locally known as dunkcha, is also a popular food item (Kala *et al.*, 2004). The seed is ground into a powder and used as a condiment (Facciola, 1990). The fruit is rather small but is produced in clusters which make harvesting easy. Each fruit contains a single seed and young leaves are used as condiments (Gupta, 1945; Tanaka, 1976; Facciola, 1990). The fruit contains 1.5% essential oil (Chopra *et al.*, 1986). The oil obtained from plant is known as *Zanthoxylum* oil or Nepali pepper oil. The essential oil is obtained by stem distillation of the dried fruits. The oil being rich in linalool, and also containing limonene, methyl cinnamate and cineole. It is used as anti infectious, sedative, and for curing diseases like arthritis, cholera and toothache. It is also used as a spice, and as pepper substitute (Gupta, 1945; Tanaka, 1976). All the plant parts like seeds, bark, fruits, branches,

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