

# KARYOMORPHOLOGICAL STUDIES IN FOUR SEED SPICES OF UMBELLIFERAE

Rita Paul<sup>2</sup>, Aninda Mandal<sup>1</sup> and Animesh K. Datta\*<sup>1</sup>

<sup>1</sup>Department of Botany, Cytogenetics and Plant Breeding Section, University of Kalyani, Kalyani, West Bengal, India

<sup>2</sup>Department of Botany, Charuchandra College, Kolkata- 29, India

\*Corresponding author email: dattaanimesh@gmail.com

**Abstract:** Karyomorphological studies were performed in four seed spices of Umbelliferae (the species also possesses immense therapeutic uses) namely, *Apium graveolens* L. (celery), *Cuminum cyminum* L. (cumin), *Foeniculum vulgare* Mill. (fennel) and *Trachyspermum amni* L. (ajowan) and it revealed six (celery:  $2n = 22 = 4D_{sm}^{sc} + 2D_{sm} + 2C_m^{sc} + 10C_m + 2J_m + 2K_{sm}$ ; cumin:  $2n = 14 = 2D_{sm} + 2E_{st}^{sc} + 4E_{st} + 2G_{sm} + 2H_{st} + 2I_t$  and ajowan:  $2n = 18 = 2A_{sm}^{sc} + 2B_{st} + 2C_m^{sc} + 4C_m + 2D_{sm} + 6E_{st}$ ) and four (fennel:  $2n = 22 = 8C_m + 4D_{sm}^{sc} + 2D_{sm} + 8F_m$ ) morphologically distinct chromosome types. Metacentric chromosomes were prevalent in celery and fennel; while, a telocentric pair was located in cumin. Characteristically two long and two short pairs of chromosomes were marked in ajowan and celery respectively. Total haploid chromatin length was noted to be  $30.41 \mu m \pm 2.30$  in celery,  $19.04 \mu m \pm 1.61$  in cumin,  $29.12 \mu m \pm 2.73$  in fennel and  $32.45 \mu m \pm 3.52$  in ajowan. Celery and fennel were found to possess symmetric karyotypes. Satellites in all the cases were associated to short arms.

**Keywords:** Karyomorphology, Seed spices, Umbelliferae

## REFERENCE

- Baijal, S.K. and Kaul, B.K. (1973). Karyomorphological studies in *Coriandrum sativum* L. and *Cuminum cyminum* L. *Cytologia*, **38**: 211-217.
- Bell, C.R. and Constance, L. (1957). Chromosome numbers in Umbelliferae I. *American Journal of Botany*, **44**: 565-572.
- Darlington, C.D. and Wylie, A.P. (1955). Chromosome Atlas of Flowering Plants. George Allens and Unwin Ltd., London.
- Deng, R.N.; Liu, B.B.; Cai, M.L.; Hao, D.C.; Li, R.F. and Liu, Y. (2006). Cytological studies on the medicinal plant *Foeniculum vulgare* Miller. *Journal of Huazhong Agricultural University, Natural Science Edition*, 2006-06.
- Ghaffari, S.M. and Tajik, F. (2007). Chromosome counts of some angiosperm species from Iran (III). *Rostaniha*, **8(2)**: 74-83.
- Hirahara, S. and Tatuno, S. (1967). Cytological studies on *Narcissus* I. Karyotype and nucleolus of *Narcissus jonquilla*. *Cytologia*, **32**: 553-559.
- Hore, A. (1976). Cytological studies of the genus *Foeniculum* (Umbelliferae). *Indian Agriculturist*, **20**: 183-191.
- Huziwar, Y. (1962). Karyotype analysis in some genera of Compositae. VIII. Further studies on the chromosomes of Aster. *American Journal of Botany*, **49**: 116.
- Masoud, S.; Kalhor-Home, N. and Poorneydanei, A. (2007). Cytogenetic study of some populations of *Foeniculum vulgare* (Umbelliferae) in Iran. *Caryologia*, **60(3)**: 257-261.
- Paul, R. (2005). Cytological and cytogenetical consequences of induced mutagenesis (Gamma-rays and EMS) of four spice yielding plants of Umbelliferae (*Apium graveolens* L., *Cuminum cyminum* L., *Foeniculum vulgare* Mill. and *Trachyspermum amni* L.). Ph.D. Thesis, University of Kalyani.
- Paul, R. and Datta, A.K. (2003). Chromosomal studies in four seed spices of Umbelliferae. *Indian Journal of Genetics and Plant Breeding*, **63(4)**: 361-362.
- Pruthi, J.S. 1998. Spices and Condiments. 5<sup>th</sup> Edition- Published by National Book Trust, India.
- Raghuvanshi, S.S. and Joshi, S. (1966). *Foeniculum vulgare*: Polyploidy, Translocation Heterozygosity and Pollen Variability. Part I. *Cytologia*, **31**: 43-58.
- Sharma, A.K. and Ghosh, C. (1954). Cytogenetics of some of the Indian Umbellifers. *Genetica*, **27**: 17-44.
- Subramanian, D. (1986). Cytotaxonomical studies in South Indian Apiaceae. *Cytologia*, **51**: 479-488.
- Zhao, D.; Zhang, S.N.; Zheng, J.S.; Liu, H.J. and Hou, X.L. (2011). Karyotype analysis for pollen mother cells meiosis diakinesis of *Apium graveolens* L. *Journal of Nanjing Agricultural University*, 2011-01.