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Indus writing is multilingual: a part-syllabic system at work

Srinivasan *et al*. (**page 147**) have applied the information theory and entropy concept to decipher the Indus script left behind by the Indus Valley Civilization. They mainly dwell upon the corpus on Indus writing brought out by Iravatham Mahadevan (IM) for analysis and arrive at a conclusion that the script underlying the writing system belongs to part-syllabic and abugida type. The scripts of all Indian languages belong to part-syllabic system of writing. The characteristic features of part-syllabic, namely the presence of initial-vowel and medial-vowel signs are brought out from the Indus text. Ten medial-vowel signs identified that do not appear at the beginning position in words from Indus text. Another corpus referred to by the authors is available online and brought out by Bryan Wells.

The Identical looking texts found from the two major metropolitan cities, Mohenjodaro and Harappa reveal that a common script was in practice and used to represent a multiplicity of languages. The authors could trace the origin of the ancient and modern Indian language scripts from Indus writing. They believe that the short text bearing seals were used for the purpose of propagating literacy among people. A judicious grouping of one or more of these medial-vowel signs together with other signs representing consonants yield one-to-one correspondence with the consonant–vowel sequence for the presence of Tamil, Kannada, Telugu, Prakrit and Sanskrit like orthographic features. The genesis of Brahmi and Kharosthi script is also traced from Indus text.

The conjunct consonants made up of more than one consonant also occur in Indus text. A comparison with the actual number of consonant–vowel combination in Kannada agrees with the number of unique signs that precede with the medial-vowel sign in Indus text. An indication of script reformation that took place in Harappan province is also revealed. The semblance to the Dravidian languages is ascertained by identifying the short vowels for 'e' and 'o' from Indus text. The demographic details of the Dravidian and Aryan presence in Mohenjodaro and Harappa are also discerned from a sub-set of Indus corpus.

Functional specialization in *Amomum subulatum*

Large cardamom (*Amomum subulatum* Roxb.) is one of the important spice crops of north eastern Himalayan region of India. Its productive trait (capsule) is the function of effective pollination carried out by bees. Moreover pollination diversity, population density, visitation frequency, and quality and quantity of pollen that carries to stigma are major biotic factors affecting pollination and fruit set in large cardamom. Additionally, the role of floral traits and rewards in recruiting pollinators and exhibition of functional specialization are vital components for pollination. Kishore *et al*. (**page 193**) report functional specialization in *A. subulatum* in recruiting specific pollinators and in exhibiting pollination syndrome. Among diverse assemblages of animals only native bumble-bees (*Bombus braviceps* Smith and *Bombus haemorrhoidalis* Smith) acted as effective pollinators in terms of visitation frequency, pollination efficiency, pollination potential index, pollen delivery and fruit set, whereas *Udapses folus* and *Macroglossum* sp. acted as nectar robbers and *Apis cerena* and *Episyrphus balteatus* were pollen-resource wasters. Moreover, native bumble-bees were the sole functional group that increased the plant's fitness by being the 'most effective pollinators'. There was a clear indication that except bumble-bees, no visitor contributed differentially to the selective pressure exerted via the reproductive success of the plant. Moreover, floral traits respond differentially to selective pressure and contribute more towards functional specialization and in turn pollination syndrome. Medium tongue length and proficient nectar-foraging behaviour made bumble-bees the most effective pollen vectors. Whereas low secretion rate of nectar during morning hours could be the strategy of plants to bring about pollination effectively by instigating bumble-bees to move deep inside the labellum and the anther–stigma column. Hence *A. subulatum* may be categorized as an obligate specialist as it recruits only the bumble-bee as the most effective pollinator, thereby giving evidence of pollination syndrome.

Characterization of inter-specific hybrids derived from *Momordica* species

Momordica L. (Cucurbitaceae) comprises 60 species distributed chiefly in Africa and Southeast Asia, of which seven species are distributed in India. These species have a huge potential to be exploited as alternative crops not only for their nutritive value, but also for improving the livelihood of the tribal and poor farming communities. A crossing programme involving seven species of *Momordica* and two varieties of *Momordica charantia* was undertaken and 56 cross-combinations were generated. Within the sect. *Momordica*, high crossability and pollen fertility was observed in the inter-varietal cross, whereas low crossability and moderate pollen fertility was observed in the inter-specific cross. No crossability barriers were found within the sect. *Cochinchinensis*, except for the combinations, viz. *M. cochinchinensis* × *M. dioica* and *M. cochinchinensis* × *M. sahyadrica*. *M. dioica* and *M. sahyadrica* showed higher crossability with *M. subangulata* subsp. *renigera* (both directions) and *M. cochinchinensis* (unidirectional). Cross between the sect. *Momordica* and *Cochinchinensis* yielded parthenocarpic fruits. *M. cymbalaria* (sect. *Raphanocarpus*) was neither crossable with sect. *Momordica* nor sect. *Cochinchinensis*. Based on crossability, a closer relationship was found between two varieties of bitter melon (var. *charantia* and var. *muricata*) and also between *M. charantia* and *M. balsamina*. All dioecious species included in this study appear to be closely related. The results sustain the recent taxonomic classification of the genus and present evidence on species relationships within the genus *Momordica*. See **page 178**.