in all the cultures within a week (figure 1). The callus was yellowish-white and friable; it failed to differentiate organs on subculture to the same medium. The responses were nearly similar when the buds were implanted on BM + CW (15%) + NAA/IBA/2,4-D (1 ppm). Squash preparations of portions of actively growing callus showed densely cytoplasmic cells with prominent nuclei. Generally, the cells were uninucleate but cells with 2 or 3 nuclei were also noted. In addition several multicellular structures and filaments of cells were noticed.

The subcultured callus exhibited unlimited growth on BM + IAA/NAA/kinetin (0.25, 0.5, 1, 2 or 5 ppm) but no organogenesis ensued. However, only rooting occurred on BM + IAA (0.5 ppm) + kinetin (0.5, 1 or 2 ppm); BM + IAA (2 ppm) + kinetin (2 ppm) (figure 2).

The anthers containing tetrads or uninucleate pollen grains when reared on BM and BM + CW (15%) or CH (500 ppm) or 2,4-D (1 ppm) senesced after 2 weeks. But on BM + CW (15%) + 2,4-D (1 ppm) the anthers swelled considerably within 2 weeks followed by proliferation from the wall layers (figure 3). In another week a profuse mass of yellowish-white, friable callus was formed and the pollen grains remain unchanged (figure 4). The callus proliferated in subculture but failed to undergo organogenesis on BM + IAA/2,4-D/kinetin (0.25 to 5 ppm), but rooted in all concentrations of NAA tried excepting at 5 ppm.

Squash preparations of callus developed on BM + CW (15%) + 2,4-D (1 ppm) showed preglobular, globular and elongated embryoids (figures 5–7) which failed to reach maturity.

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CHEMOTAXONOMY OF *PANDANUS* AND *TYPHA*

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THE present note is an attempt to adduce the affinity between the two genera, *Pandanus* and *Typha* on the basis of chemical evidence and the evidence from collateral disciplines and to see how far their segregation is justified.

Standard tests[1] with the fresh material and ethanolic extracts of *Pandanus odoratissimus* Roxb. and *Typha angustata* Bory and Chaub showed the absence of anthraquinones, aucubin compounds, cyanogenic glycosides, hydroxy quinones, indoles, Juglone, lignans, methylene dioxy compounds, saponins, syringaldehyde and syringyl radicals and the presence of similar flavonoids, simple phenols, raphides, steroids, tannins and triterpenoids. The above results are in conformity with those of the few tests conducted by Gibbs[1], who also recorded the presence of caffeic and *p*-coumaric acids in these two taxa. *Pandanus*, however, differs from *Typha* in the absence of catechol-tannins and leucoanthocyanins, presence of alkaloids and positive results for the activity of the enzyme polyphenolase. Gibbs[1] recorded the absence of such phenolic compounds as kaempferol, cyanidin, sinapic and ferulic acids in *Pandanus* and presence of the same in *Typha*.

Sparganium[1] exhibits more similarities in chemical characters with *Typha* than with *Pandanus* (present study). Thus there seems to be a chemical homogeneity among these three taxa. Further the similarities in unisexual flowers, spicate inflorescence, reduced perianth, endospermic seeds, monosulcate pollen grains, vessel and chromosomal characteristics substantiate this view. Sharma[2] had suggested their inclusion under one order Pandanales on cytological grounds. Thus though the totality of evidence and numerical assessment[3] of the characters drawn from diverse disciplines such as anatomy[4], chemotaxonomy[1] (present study) cytology[2,5], morphology [6,7], and palynology[8] lend support to the close kinship among the three genera and their retention under one Englarian[9] taxon Pandanales and negate their segregation, a study of a large number of taxa is necessary.

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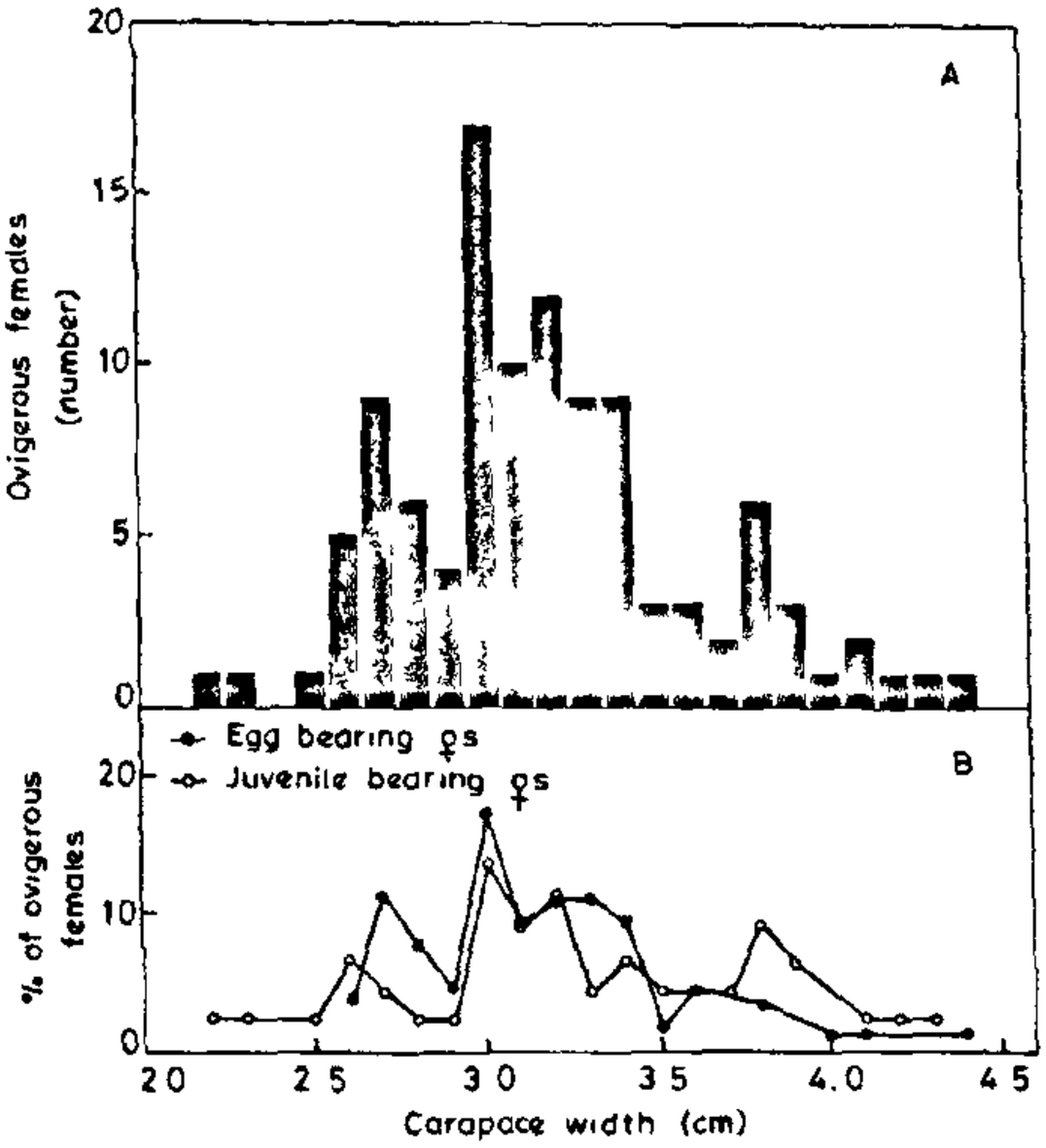

Figure 1. *Oziotelphusa senex senex*: Abundance of ovigerous females in relation to the body size of the crab (Carapace width: CW). **A.** Number of ovigerous females in relation to the size **B.** Percentage abundance of egg/juvenile bearing females in relation to the size.

OBSERVATIONS ON THE REPRODUCTIVE PATTERN AND FECUNDITY OF A BRACHYURAN CRAB

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THE tropical freshwater riceland crab *Oziotelphusa senex senex* has a wide distribution. Aspects of reproductive pattern and fecundity of the species are interesting.

In and around Bangalore, ovigerous females of *O. senex senex* are available only during April through July. The crab perhaps breeds only once during this part of the year. There appears to be a relation between body size and ovigericity in the female. While 2.2 cm is the minimum carapace width of an ovigerous female, 4.4 cm is the maximum. However, maximum incidence of ovigericity is noticed in females ranging between 2.6 cm and 3.9 cm carapace width (figure 1A & B).

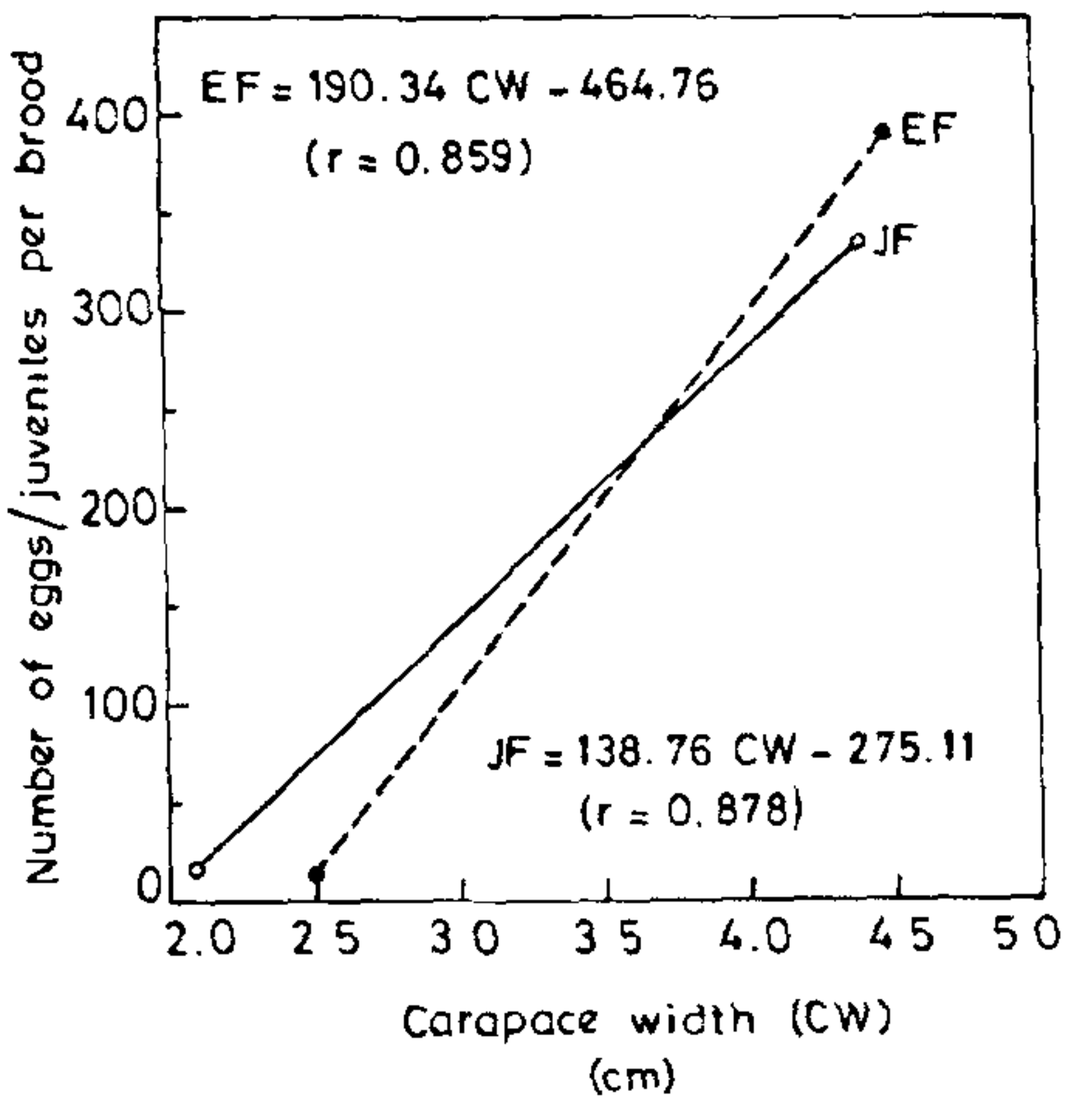

Figure 2. *Oziotelphusa senex senex*: Relationship between egg fecundity (EF) and juvenile fecundity (JF) in relation to the Carapace width (CW) of the females.