on the second stimulation with little further change on the third.

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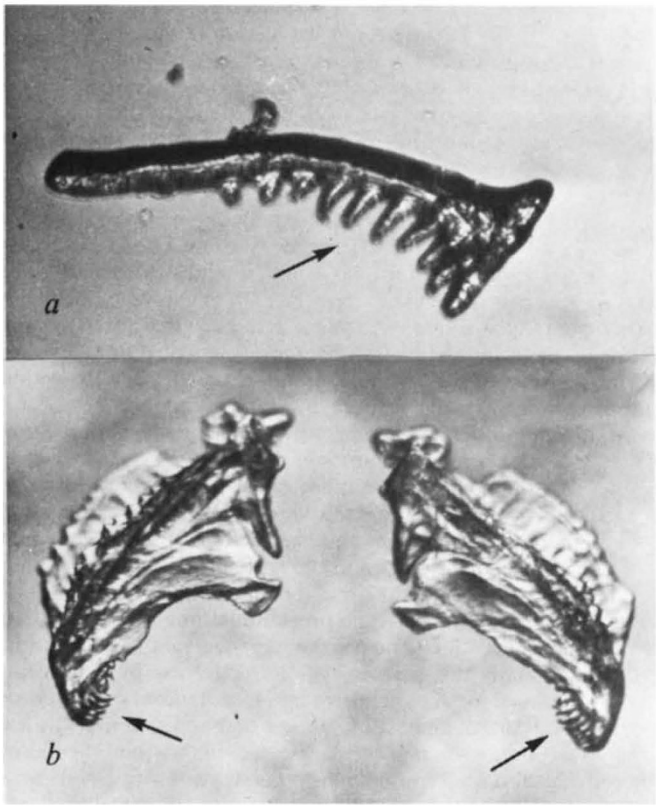
Odontoid processes in pipefish jaws

Absence of jaw teeth of any kind has been considered a familial character in pipefishes (Syngnathidae)[1-3], and their feeding mode has generally been described as a picking or sucking process resulting from rapid intake of water through the elongate snout[4,5]. During systematic studies of Indo-Pacific syngnathids, we have found toothlike processes on the premaxillae and dentaries in three genera of abdominal-pouch pipefishes (Gastrophori). These structures (Fig. 1) are best developed in *Choeroichthys sculptus* (Günther) and *C. brachysoma* (Bleeker) where they are readily seen under ×30 magnification in all subadults and adults. In *Syngnathoides* Bleeker (dentaries only) and a newly described genus[6], they are inconspicuous, and best seen in cleared and alizarin-stained material.

Histological sections (from *Choeroichthys sculptus*) show no evidence of enamel, pulp cavity or basal differentiation in these processes and they appear to be odontoid projections of bone, rather than true teeth. Nevertheless, location and gross morphology suggest that they serve as functional teeth, and that they may be used in browsing or some other previously unreported mode of pipefish feeding. Data on food items are unavailable, but the habitats of these forms lend some support to this assumption. All *Choeroichthys* species and the undescribed genus are associated with coral or rocky bottoms; *Syngnathoides*, monotypic, is reported to live on weeds[3]. Each of these habitats would provide suitable niches for grazing pipefishes.

Fig. 1 Odontoid processes of *Choeroichthys sculptus*. *a*, Right premaxilla, maximum length about 0.8 mm; *b*, mandibles, maximum length about 0.9 mm. Arrows indicate 'teeth'.



These odontoid processes constitute a newly recognised character of systematic importance and may prove significant in studies of pipefish phylogeny.

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Corpus allatum and ovarian growth in a polymorphic paedogenetic insect

In parthenogenetically reproducing *Aphis craccivora* Koch, ovarian growth is initiated before birth and continues throughout larval life[1]. Consequently, maintenance of the juvenile form and reproduction occur simultaneously in this insect. The corpus allatum has been shown to be active in both these processes in other insects where ovarian growth does not commence until after the larval stages are completed[2]. To elucidate the role of the corpus allatum in the two simultaneous processes in *A. craccivora*, I have studied the gland and ovarian development during the larval stage. Both apterous and alate aphids were used as these two morphs have a different ovarian growth pattern in *A. craccivora*[1].

Aphid ovaries were examined from birth to the onset of larviposition by dissection in distilled water after rapid fixation in Gilson's fluid. An index of ovarian development was found by calculating the total length of oocytes and embryos present in the body. Aphid heads were fixed in Gilson's fluid, sectioned sagittally at 6 μm and stained with Ehrlich's haematoxylin. Corpus allatum nuclei were measured with an eyepiece micrometer and the mean nuclear size was calculated using the mean product of the long and short diameters of four nuclei in the gland[3].

The mean nuclear size of the corpus allatum was positively correlated with the ovarian index in both apterae ($r = 0.91$, $P < 0.05$) and alatae ($r = 0.95$, $P < 0.05$) up to the onset of larviposition. This correlation was maintained in each morph even though their ovarian development is out of phase. Apterae have a greater corpus allatum mean nuclear size and ovarian index than alatae during larval life until the adult moult when larviposition occurs in apterae. But the two parameters continue to increase in alatae until larviposition occurs approximately 2 d after the adult moult.

The growth of the corpus allatum during the larval stage was enormous compared with that of body length and head width. Corpus allatum volume increased elevenfold from birth to the final moult while body length and head width showed a fourfold increase. The mean length of the terminal ovarian follicle increased tenfold in the same period.

My results provide strong evidence that the corpus allatum in *A. craccivora* is simultaneously involved in ovarian growth and maintenance of the juvenile form during the larval stage. Further proof for the extra role of the corpus allatum during larval life in *A. craccivora* compared with non-paedogenetic insects is given by the measurements of relative growth of the gland and other body parts. A comparative study of several