since *Sphenophyllum utkalensis* is so far unreported from any other locality it is useful only in suggesting that the variety of sphenophyllums in Gondwanaland is greater than what has been recognized by earlier authors[9-11]. Indeed the situation presents a sharp contrast with that which existed in the early years of the 20th century when only *S. speciosum* was known from India[12].

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VITELLOGENIN OF ALFALFA POLLINATING BEE *MEGACHILE FLAVIPES*

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PROTEIN metabolism plays an important role in the reproductive development in insects. The haemolymph protein concentration is a reflection of changes occurring during the ovarian development. Many mature females contain proteins that are not detected or are not readily detected in the haemolymph of males[1-10]. These proteins form the bulk of egg protein[1, 11]. And in view of their function they were termed as vitellogenin(s)[6], where vitellogenins are defined as precursors for protein of the yolk as they are produced by extra ovarian tissue[6, 12], and are taken up at the oocyte surface by pinocytosis[13, 14]. Once inside the ovarian wall, these proteins may turn complex into relatively larger aggregates which are too large to diffuse out through the membrane[12, 15-17]. They are selectively incorporated into the yolk of the developing oocytes and eventually comprise 70–90% of the total yolk protein[18, 19]. Because these proteins are essential for yolk formation, and are characteristic of only egg-maturing females, they have been termed as 'vitellogenin(s), vitellogenic protein(s) or 'female specific' protein(s)[6, 20]. The present paper enlists the characterization and age-dependent changing pattern in the vitellogenin of an alfalfa pollinating bee *Megachile flavipes* Spinola.

Material for this study was an alfalfa pollinating sub-tropical megachilid bee *M. flavipes* (Megachilidae, Hymenoptera). Haemolymph from the female and male bees was collected with the help of micropipette by clipping off antenna. Soluble proteins were fractionated on polyacrylamide gels in an anionic system by directly applying haemolymph of the bees in the space above gels in the gel tubes following method of Davis[21] and Ornstein[22]. For characterization of vitellogenin(s), extract of newly laid egg, prepared in phosphate buffer of 6.8 pH was subjected to the above qualitative analysis and vitellogenin was identified by comparing the mobility of different protein-fractions in the electropherograms of haemolymph of male and female bees and of egg homogenate. The fractionated gels were subjected to spectrophotometric scanning with the help of 'Beckman spectrophotometer Model 50' and the pattern of buildup of vitellogenin was studied.

The female fractions showed 8 bands (figure 1a). Mobility of band 5 of female electropherogram was identical to fraction 5 of egg-homogenate electropherogram and it was absent in the male electropherogram (figure 1 b, c). Then band 5 of female electropherogram seemed to represent vitellogenin fraction. The pattern of its build-up is shown in figure 2. This fraction was absent in the newly emerged females and appeared in one-day old females feeding on natural diet of pollen and nectar. It increased in 2-day old bees and showed a

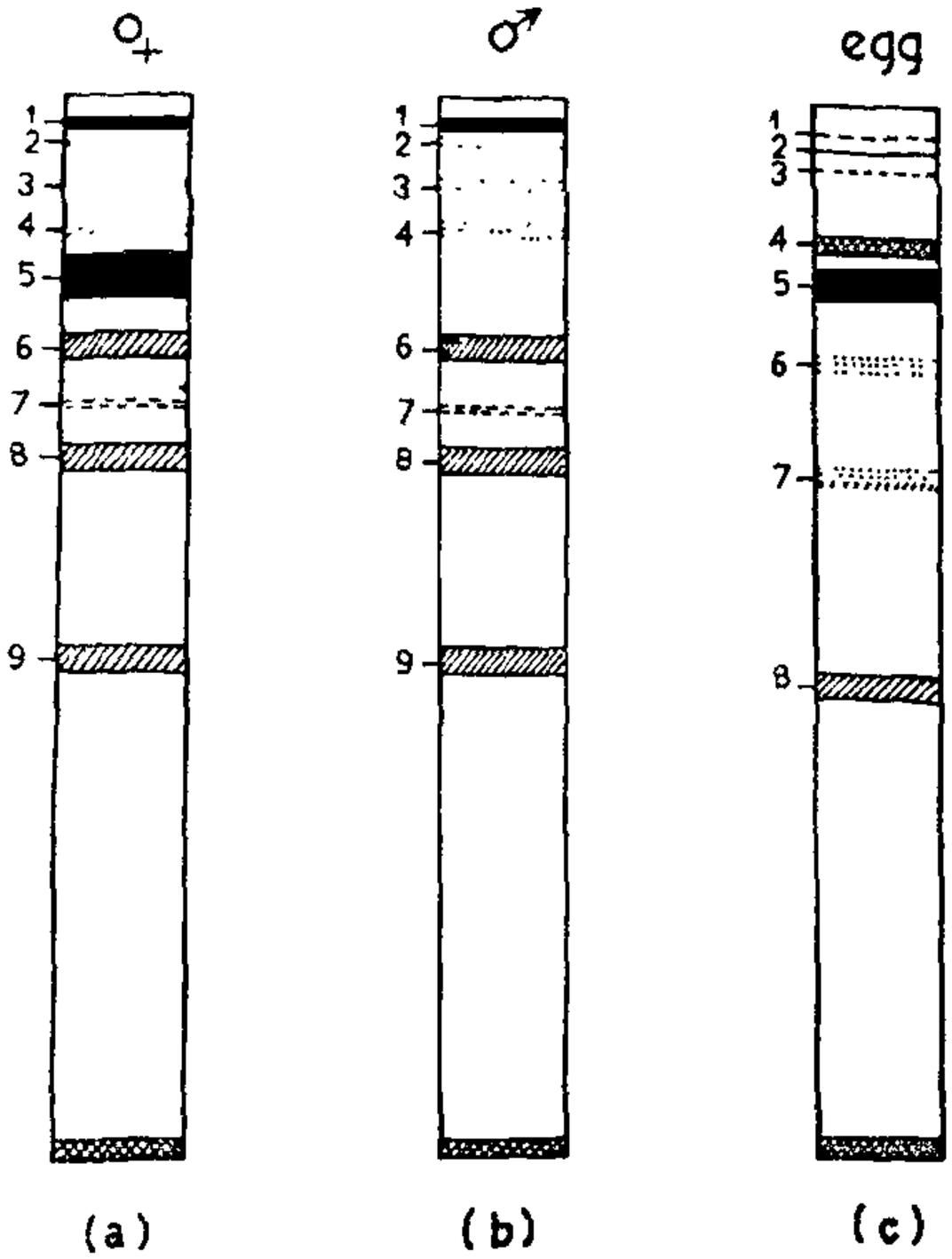

Figure 1. Electropherogram of (a) haemolymph of female bee, (b) haemolymph of male bee, and (c) egg homogenate. Band 5 represents the vitellogenic fraction. Note the presence of this fraction in female haemolymph and egg homogenate electropherograms and absence in male electropherogram. Protein bands other than fraction 5 in the electropherogram of egg homogenate may be due to the formation of complex/simpler yolk proteins from vitellogenic protein. Solid lines show the highest optical density followed by stripped and dotted bands respectively. The band at the base of electropherogram represents the tracer dye.

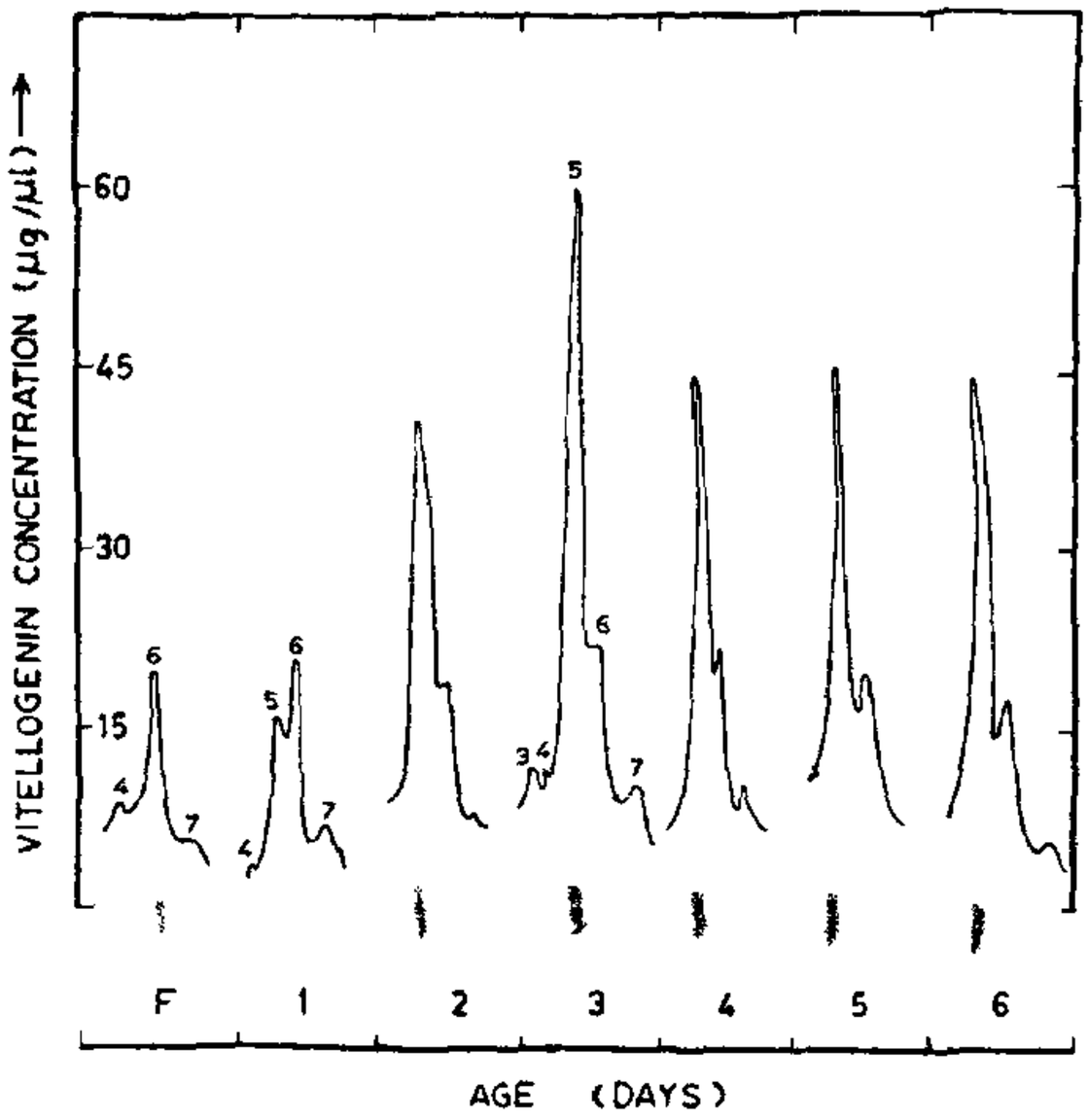

Figure 2. Age-dependent changes in the build-up of vitellogenin (fraction 5) as evidenced by spectrophotometer scanning of the gels. F: freshly emerged bee.

peak in 3-day old female bees which later declined on day 4 after emergence. The level of this protein was then maintained during the egg maturation period of these bees (beyond 6 days not shown here). The earlier rapid increase in the vitellogenin indicates that its uptake by the developing oocyte is slow in the beginning of egg maturation till day 3 when a peak is achieved. But probably the uptake becomes very rapid on day 4. This may be the reason of the decline in the titre of vitellogenin to a level which is then maintained during the egg maturation period of the bees. This contention is supported by the fact that first egg in this bee is laid on day 5 after emergence[23] after which regular egg laying process continues, keeping the level of vitellogenin almost constant.

The interesting part of this study is the presence of only one vitellogenin in this species. Several reports reveal that the build-up of this protein is closely related with the total haemolymph proteins of the insects and has a close relation with the developing oocyte[23]. Maintenance of its level from 4th day onwards during the egg maturation period of bees probably indicates its proportioned utilization by the developing oocytes. However, its relationship with the build-up of total haemolymph protein titre and growth of basal oocyte in this bee demands investigation which will make the picture clear.

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NEWS

MÖSSBAUER DISCUSSION GROUP–SILVER JUBILLEE MEETING

The silver jubilee meeting of the Mossbauer Discussion Group was held in Oxford, 2–4 July 1984. The meeting was attended by 110 Mössbauer spectroscopists from 19 countries.

The scientific sessions were held in the inorganic chemistry laboratory with invited lectures on the use of Mössbauer spectroscopy to investigate matters relating to bonding, magnetism, structure, relaxation and dynamics, given by R. V. Parish (UMIST), M. Thomas (Liverpool), G. J. Long (Missouri-Rolla), and S. Dattagupta (Hyderabad). Other invited lectures covering the application of Mossbauer spectroscopy to the study of rare earth intermetallics, spin transitions in solids, molecular re-orientation, small particle minerals and catalysis were given by L. Asch (Munich), H. Speiring (Mainz), B. W. Fitzsimmons (London), S. Morup (Denmark), B. Goodman (Aberdeen), and J. W. Niemantsverdriet (Delft). Over 20 other papers were delivered, and the presentation of nearly 60 posters, in two poster session, illustrated the range of topics now being covered by Mössbauer spectroscopists and the large variety of isotopes currently in use. A silver jubilee banquet was held in Wadham College to celebrate this important landmark in the history of the Mössbaur Discussion Group after which Professor C. F. Johnson (Liverpool) gave an enlightening account of the introduction and early days of Mössbauer spectroscopy in the U.K.

A new Chairman, Dr R. V. Parish (UMIST) was elected on the retirement from office of Dr B. W. Fitzsimmons (Liverpool).

The 26th meeting of the Mossbauer Discussion Group will be held at the University of East Anglia, 8–10 July 1985.

Further information may be had from: Dr F. J. Berry, Department of Chemistry, University of Birmingham, PO Box 363, Birmingham B15 2TT. (*Chemistry in Britain*, Vol. 20, No. 9, September 1984, p. 839.)