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Changes in Tubuliform Silk Glands during the Cocoon Production in the Garden Spider, *Argiope bruennichii*

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The silk glands of the spiders are of several types. Among these, the principal fibers used in constructing the eggcase are products of the tubuliform (or cylindrical) glands, which are present only in females. And development of these glands parallels maturation of the ovaries. The tubuliform gland spigots of the garden spider, *Argiope bruennichii* Scopoli, have a noticeably wider aperture than those of other types silk gland types, reflecting the relatively large size of the tubuliform gland fiber. Examinations of formed fibers indicate a multicomponent internal structure, and electron micrographs reveal each fiber contains numerous electron lucent fibrils embedded in an amorphous electron dense matrix. These heterogeneous fibers not necessarily taking place in a uniform manner throughout the length of the tubuliform gland. By the several evidences obtained from electron microscopical observation, a mechanism related to eggcase silk formation can be presented.

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Egg Maturation during the Ovarian Development in the Garden Spider, *Argiope bruennichii*

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The Spiders never lay eggs singly and use silk to protect their eggs, therefore, silk has an additional function as a container to keep the eggs. At this experiment we divided the stages of egg maturation into four remarkable phases according to their behavioral characteristics, such as, before mating, after mating, before egg-laying and after egg-laying stages. By the fine structural examination of the egg maturation during the ovarian development in the garden spider, *Argiope bruennichii*, the yolk comprised two granular components - electron dense proteid yolk and electron lucent lipid yolk. Accumulation of yolk materials within the oocyte cytoplasm was initiated during the last moulting period, and rapidly accelerated after copulation. It has been also revealed that the development of the ovary was paralleled with not only maturation of the fat body but also development of the tubuliform silk glands. Therefore, by the several evidences obtained from electron microscopical observation, the fine structural aspects related to egg maturation can be presented.