covered with wax secreted from the special wax glands of oviparous female, which dies in the process of egg laying. A significant finding is that the sexuals do not increase in body size from first instar to adult stage.

It is quite striking to note the occurrence of virginoparae, sexuparae and sexual morphs in the same region from July to November. The role of different environmental factors and the cytogenetic mechanisms involved in the production of different morphs in this aphid species are still unknown; however, the present findings are useful in stimulating further work on these aspects in the woolly apple aphid.

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OCCURRENCE OF *THELEPHORA TERRESTRIS* IN INDIA

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DURING a survey of fungi in mycorrhizal association with *Pinus patula* in Kodaikanal, Tamil Nadu, we collected sporophores of *Thelephora terrestris* in two consecutive seasons. This fungus has been known to produce ectomycorrhizae with *Pinus elliotii*[1], *P. virginiana*[2], *P. strobus*[3], *P. rigida*[4], *P. echinata*[5], *P. palustris*, *P. clausa*, *P. sylvestris*, *P. lambertiana*, *P. monticola*, *P. ponderosa*[6], *P. michoacana*, *P. teocote*, *P. rudis*, *P. pseudostrobus*, *P. ayacahite*, *P. leiophylla*[7], *P. taeda*[8], *Arbutus menziesii*[9], *Arctostaphylos ura-ursi*[10] and *Picea sitchansis*[11]. It is possible that *T. terrestris* is in mycorrhizal association with *Pinus patula* in the Kodaikanal area and further experimental work is in progress. Since *T. terrestris* has not so far been reported from India a description of the fungus is given below. The colour terminology used is that of Kornerup and Wanscher[12]. The specimens are deposited at the Herbarium of Madras University Botany Laboratory (MUBL).

Thelephora Terrestris Fr., Syst. Mycol. 1:432 (1921)

Pileate, sessile to subsessile, in imbricating rosettes, effuso-reflexed, up to 10 cm broad in masses. Pileus up to 5 cm broad, ascending, tomentose to fibrillose scaly, soft, dark brown (6F6–8F5); margin incised. Hymenium inferior, papillose, greyish brown (8D3) or chocolate brown (5F4). Context up to 2 mm thick, greyish brown (8D3). Spore print colour brownish grey (4D2). Spores 8.4–11.2 × 5.6 – 8.4 μm, angularly ellipsoid, lobate, smooth to echinulate, spines very small, guttulate. Basidia 35.0–70.0 × 7.0–11.2 μm, 4-spored, sterigmata up to 7.0 μm long, thin walled, hyaline. Cystidia absent but basidioles present, brown in 10% KOH. Hyphae 4.2–11.2 μm diam., branched, thick walled (up to 1.4 μm thick), with clamp connections, brownish in 10% KOH, hyphal fibrils turning dark brown in 10% KOH.

On ground in *Pinus patula* plantation, in groups, 1972 Pine regeneration area, Konalaru, Kodaikanal, Tamil Nadu, 13 August, 1978, Coll. K. Natarajan and N. Raman. Herb. MUBL No. 2670.

On ground, in groups, *Pinus patula* plantation, Kundar, Kodaikanal, Tamil Nadu, 21 December, 1979, Coll. K. Natarajan and N. Raman. Herb. MUBL No. 2671.

Corner[13] recognised 6 forms under this species. The present collections agree with *T. terrestris* f. *terrestris* because of the sessile, effuso-reflexed, dark brown pileus.

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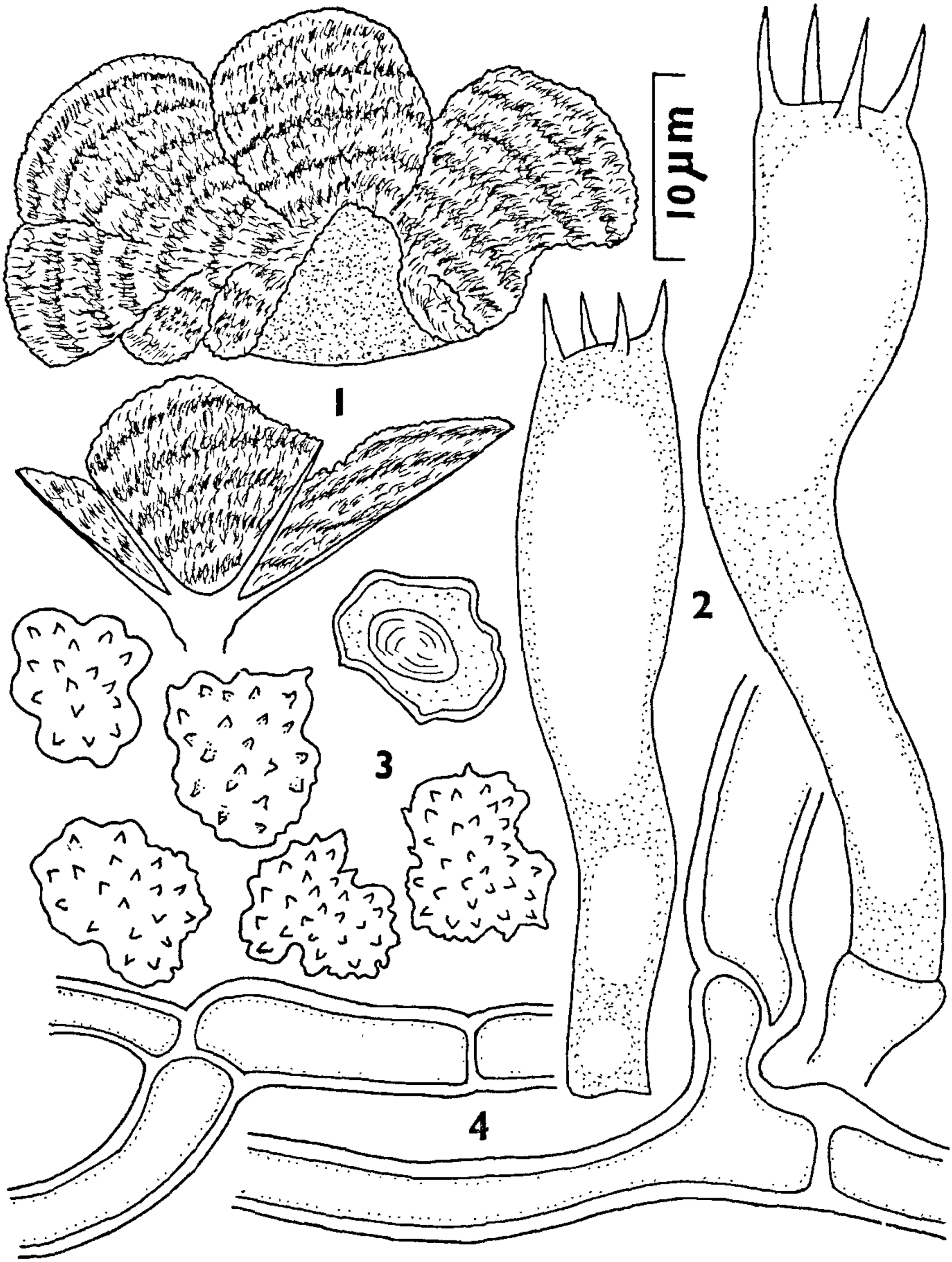

Figures 1-4. *Thelephora terrestris* **1.** Habit × ½ **2.** Basidia **3.** Spores **4.** Hyphae of the context.

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SOLUBILITY OF PROLINE AND ITS BIOLOGICAL SIGNIFICANCE

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PROLINE is the amino acid which accumulates in large quantities (upto 15,000 to 20,000 $\mu g\, g^{-1}$ dry weight) under moisture stress in leaves[1-3]. Steward and Lee[4] have shown that 90% of the free amino acid that accmulates under saline conditions is proline. Proline shows unusual properties which are characteristics of hydrophilic colloids[5]. Recently, Paleg *et al.*[7] have shown that proline, betaine and several other compounds like hydroxyproline, glycine, valine and glycerol protect enzymes against a wide range of thermal sensitivity. Proline could also increase solute potential and this is relevant in view of its large accumulation and high solubility[6]. The solubility of proline in solutions of other compounds that are known to exist in the cell sap was investigated. The solubility of proline, glycine, glucose, sucrose, mannitol and KCl in saturated solutions of these compounds was determined.

The data in table 1 shows that in 100 ml each of the saturated solutions, the solubility of proline varies from 85 to 185 g while in these saturated solutions the solubility of other substances ranged from 14.9 to 64.8 g. The unique variation of the solubility of proline is perhaps due to the ability of proline to form micelles[6].

The variation of the solubility of proline could be of great biological significance. For a given molar concentration while the solute potential created by proline is equivalent to that of any other organic substance, the avilable free water to sustain metabolic functions could be higher. This was tested by studying the imbibition by seeds of groundnut in equimolar concentrations of several solutions and water. It can be seen from table 2 that the per cent imbibition at the end of the 4 hr was highest in water followed by solutions of proline and other solutes. This order was, however, slightly different at lower intervals of soaking.

Cucumber cotyledons grown in a medium containing benzyladenine and potassium[8] for 72 hr were kept in open petridishes at 28° C until 50% reduction in weight was noticed. Such cotyledons were transferred to water and 0.1 M solutions of proline, glycine and KCl. The per cent increase in fresh weight of such cotyledons in 15 min was determined (table 3). The data showed that increase in fresh weight was more in

TABLE 1

Solubility of different solutes (g/100 ml) in saturated solutions at 25° ± 1° C

Solutes	Saturated solution of				
	KCl	Glycine	Mannitol	Glucose	Proline
Proline	137.8	85.7	185.6	141.3	—
Glycine	24.2	—	19.5	14.9	16.2
Mannitol	23.6	20.5	—	20.2	18.4
KCl	—	33.3	53.3	30.7	32.2
Glucose	64.0	64.8	36.4	—	63.7

TABLE 2

Per cent increase in weight of groundnut seeds after soaking in equimolar (0.5 M) solutions of different solutes in water

Solutes	Per cent imbibed after different periods of soaking		
	1 hr	2 hr	4 hr
Proline	15.0	19.2	30.4
Glycine	13.6	21.4	26.0
Sucrose	12.6	17.2	20.0
Mannitol	13.4	20.0	27.0
KCl	12.9	17.6	23.4
Water only	19.0	33.4	44.4

CD at 5%, Time 0.94; Treatment 1.32; Time × Treatment 2.29.