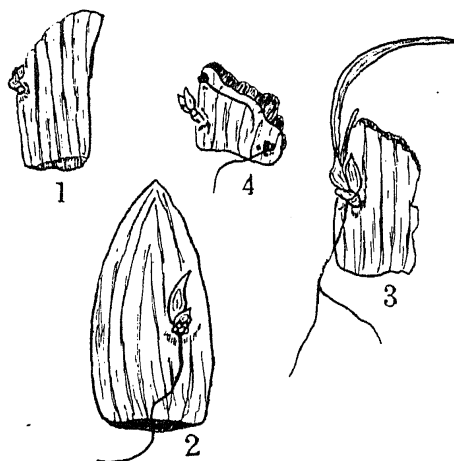


s grew into seedlings. The chromo-
unts from the root tips revealed them
teroploids with chromosome numbers
above and below the triploid num-

y be recalled here that out of the
ally filled tetraploid \times diploid cross-
were shown in pots only 15 germi-
Thus it will be seen that the per-
s of germination by the ordinary
of sowing and by embryo culture at
early stage of seed development,
it to be 23 and 100 respectively in
se. Embryo culture of very young
this way helps to secure a greater
age of F_1 plants out of incompati-
s than by the ordinary method of
tion of these seeds when ripe by pot

outer surfaces (Figs. 1, 2 & 3). A single
scale leaf sometimes produced as many as
three such buds (Fig. 4). These made their
appearance as small papillæ consisting of
two overlapping opposite scale leaves.
Later, however, they assumed the form of
normal bulbs.



es. Institute. P. UTTAMAN.
ore,
1949.

reslee, A. F., and Satina, S., "New
from incompatible crosses in *Datura*
culture of excised embryos on malt
Science, 1944, 99, 331-34. 2. Van-Over-
arie E. Conklin and Blakeslee, A. F.,
s in coconut milk essential for growth
ment of very young *Datura* embryos,"
1941, 94, 350-51. 3. Tukey, H. B., "Arti-
liture methods for isolated embryos of
is fruits," *Pro. Amer. Soc. Hort. Sci.*,
313-22.

In an experiment a portion of the stem
disc was cut and grown separately. It was
observed that the innermost scale leaf form-
ed a bud in the manner described above and
when this scale leaf was removed the scale
next to it behaved in a similar fashion. It
is apparent that the scale leaves possess an
inherent character for the production of ve-
getative buds. When, however, the scale
leaves were separated from the stem disc
and put on soil they failed to produce these
buds.

NOTE ON THE VEGETATIVE
AGATION OF *LILIUM LONGI-
FLORUM* WALL.

Botany Department, P. KACHROO.
E-Punjab University,
Amritsar,
May 25, 1949.

longiflorum Wall. belongs to the
liliaceæ. It grows in Western Hima-
m Nepal to Kumaon at an altitude
0 ft. and is commonly cultivated in
as an ornamental plant.

bulbs of this species were obtained
e Chandra Nursery, Sikkim, and
a sand and garden soil respectively.
few months when the bulbs were
ated an interesting formation of ve-
buds on the scales was observed.

sual method of vegetative propaga-
l known in bulbs is bud formation
ils of the scale leaves. In this par-
species besides such propagation,
ids were also formed on the scale
n their edges, the inner and the

A NOTE ON THE MICRO-ORGANISMS
PRESENT IN DATE-PALM JUICE
(SENDHI)

In the year 1928 M. Damodaran has done
work on "The fermentation of Toddy and
an account of the micro-organisms produc-
ing it",¹ while later in 1939 V. S. Basrur
and M. Qureshi² have done extensive
work on the Date-Palm juice (*sendhi*) con-
fining their attention to analysis only. The
present note deals with the microscopic exa-
mination of fresh and fermented juice of
Phoenix Sylovestris Roxb.

Samples of *sendhi* were obtained with the
help of the Excise Department for our inves-
tigations. Possible precautions were taken

while collecting the *sendhi* to prevent extraneous micro-organisms getting into the liquid. The micro-organisms in the fresh juice were cultured on the *sendhi*-agar media. An examination of a number of isolated colonies under the microscope led us to suspect five kinds of organisms, which represent distinct species and these were later cultured by fractional plate cultures on *sendhi*-agar media. External morphology and nature of vegetation was carefully studied on streak cultures of *sendhi*-agar media and glucose-agar media. In the fermented *sendhi* samples however, in addition to the above suspected four micro-organisms mycoderma species was also found.

To identify the above micro-organisms, the cultural and the biochemical characters of each were studied and are described below. (For the identification of the micro-organisms, *The Yeast* by Guilliermond was consulted.³)

Description of the Organisms:—

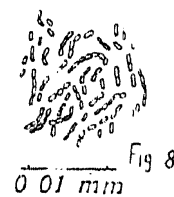
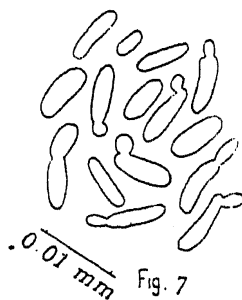
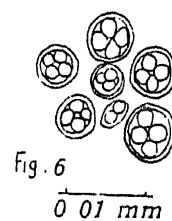
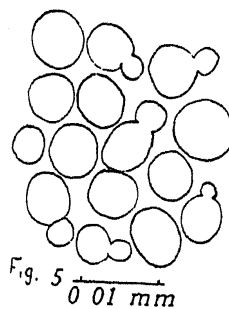
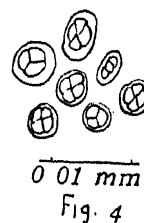
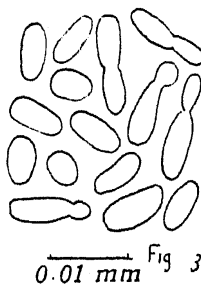
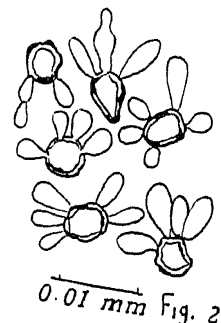
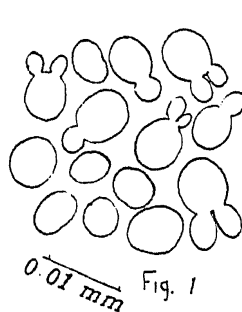
1. *Yeast A.* The colonies are club-shaped with depression in the middle and are smooth, glistening and white in colour. Streak cultures are smooth with broadly wavy margin. Multiple budding is often adopted as shown in Fig. 1. The cell form is predominantly spherical in young cultures. Durable cells are formed, and budding takes place giving rise to elongated cells as shown in Fig. 2. The thermal death point is 51-52° C. This organism is identified as "Yeast-like *Saccharomyces cerevisiae*".

2. *Yeast B.* The colonies are concentrically zoned and appear dry and powdery on the surface. Streak cultures develop flat, brown, spreading colonies. The cells are usually elongated as shown in Fig. 3. Scum is formed with growth ascending on glass wall. Four spores are formed in a cell as shown in Fig. 4. Thermal death point is 53-54° C. This organism is identified as *Pichia Radaisii*.

3. *Yeast C.* The colonies are white, pasty and with a surface formed of fine raised portions. Budding is of simple type. The cell form is predominantly spherical as shown in Fig. 5. Four spores are formed as shown in Fig. 6. Thermal death point is 52-53° C. This organism is identified as *Saccharomyces cerevisiae*.

4. *Yeast D.* The colonies are usually round, white and convex. Superficial vegetation is formed on the nutrient liquid. Cells are oblong, elongated and somewhat

elliptical. Budding occurs from end on shoulders as shown in Fig. 7. Thermal death point is 52-53° C. The organism is identified as *Mycoderma cerevisiae*.



5. *Bacteria.* The colonies are smooth, grey and glistening. Surface growth was observed after 48 hours, with a tendency to ascend at the edges. Deposit at the bottom is scanty, and slight turbidity is produced. The bacteria consists of short rods and are ellipsoidal in form. They occur singly and in pairs as shown in Fig. 8. This bacteria has many characters of *Acetobacter acetii* described by Jezdink Tosie and Thomas Kamedy Walker.⁴

To study the amount of growth and production of alcohol, the method described by F. G. Walter⁵ was followed. The results are shown in the table along with pH values.

No.	Description	Original pH	pH after incubation for 72 hrs.	Amount of growth per 100 gm. of glucose	Amount of alcohol by vol. per 100 c.c. of 3% glucose sol.
1	<i>Mycoderma cerevisiae</i>	6.0	3.0	17.1	nil
2	<i>Saccharomyces cerevisiae</i>	6.0	3.0	7.7	1.72
3	Yeast-like <i>Saccharomyces cerevisiae</i>	6.0	3.0	5.5	0.57
4	<i>Pichia kudaisii</i>	6.0	4.0	6.7	0.13

Our thanks are due to Dr. M. Qureshi under whose able guidance this work has been carried out, and also our thanks are due to Dr. S. Husain Zaheer, Director, Central Laboratories for Scientific and Industrial Research, for kindly permitting us to publish the note.

Hyderabad, Deccan, MOHAN BABU NAIDU.
June 12, 1949. J. LAKSHMIKANTHAM.

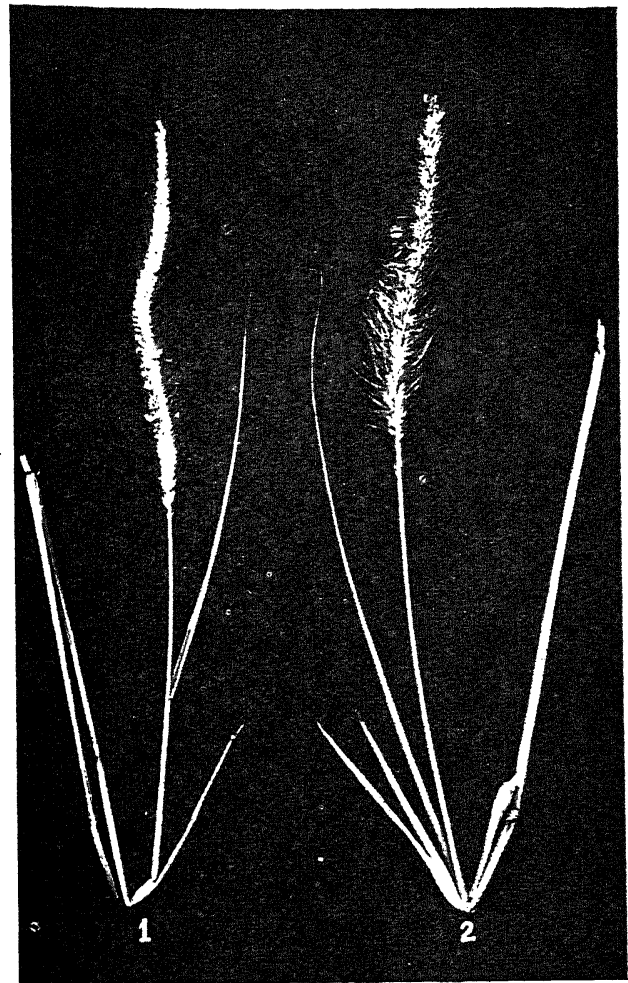
1. Damodaran, M., "The fermentation of Toddy and an account of the micro-organisms producing it," *Jour. Ind. Ins. Sci.*, 1928, 11, 63.
2. Basrur, V. S., and Qureshi, M., "Investigations on Palm Juice—Part I. Analysis of fresh and fermented juice," *Jour. Osmania Univ.*, 1939, 7.
3. Alexandre Guilliermond, *The Yeast*, 1920 (John Wiley & Sons, New York).
4. Jezdink Tosic and Thomas Kamedy Walker, "Acetobacter Acetii," *Jour. Soc. Chem. Ind.*, June 1946, 65.
5. Walter, F. G., *The Manufacture of Compressed Yeast* (1940, Chapman & Hall, Ltd., 11 Henrietta Street, W.C. 2, London).

PROLIFERATION OF SPIKELETS IN *PENNISETUM POLYSTACHYUM*; SCHULT.

ARBER (1934) observed proliferation of the spikelets of *Arrhenatherum avenaceum*, Beauv., *Festuca ovina*, L., *Phleum pratense*, L., *Poa alpina*, L., *P. vivipara*, L. and in some bamboos. Nielson (1941) has recorded such proliferation in *Avena sativa* L., *Bromus inermis*, Leyss., *B. purgans* L., *Festuca obtusa*, Spreng., *Phleum pratense*, L. and *Panicum virgatum*, L. Ganguly (1936), Reeves and Stansel (1940) have recorded maize spikelets proliferating into vegetative shoots and the latter authors have also found Teosinte (*Euchlæna mexicana*, Schrad.) showing similar phenomenon. Karper (1936) and Sankara Ayyar (1942)

have described the proliferation in Sorghum spikelets. A similar case was noted in Thin Napier (*Pennisetum polystachyum* Schult.) at the Rice Research Station at Tirurkuppam, Chingleput District, Madras, and this is being recorded here.

The normal inflorescence of *Pennisetum polystachyum* is a spike-like cylindrical panicle (Figs. 1 and 2) brownish-yellow



FIGS. 1 & 2. Normal and proliferated inflorescence compared

and about a centimetre wide exclusive of the bristles of the involucre. The involucre, sub-sessile with about 30 bristles to each involucre. The spikelets usually solitary (rarely in twos), sessile; within the involucre, lower glume often suppressed, upper as long as the spikelet, thinly membranous, 5-nerved. Florets two, the lower empty or staminate, the upper, bisexual. Lower lemma, like the upper glume, 3-toothed at apex; palea subequal similar to the lemma or sometimes absent. Upper lemma chartaceous shining; palea similar, subequal.

The inflorescences with the proliferation of the spikelets could be easily made out