

ripe, fresh date deteriorates very rapidly in flavor, due largely to the inversion of the cane sugar. For example, the unripe fruit of the seedling used in these experiments contains fifteen or twenty per cent. of cane sugar when ready to ripen, but very soon after complete ripeness this cane sugar disappears. This is due to the release of the intracellular invertase at the time of ripening. Much of the fine quality of the delicious Deglet Noor date is due to the nearly complete absence of invertase, which allows the cane sugar to remain permanently as such. By artificial ripening at their destination, the more inferior invert sugar varieties can be placed upon the table of the distant consumer with their maximum quota of cane sugar and consequently of flavor.

After moderate treatment with acetic acid, the tannin of the date has not yet become entirely insoluble but all astringency disappears in the next few hours. The intracellular invertase, however, passes into solution to quite an appreciable extent immediately after the treatment, and probably other intracellular or insoluble catalytic agents, are released simultaneously. The ripening processes are initiated not only by acetic acid, but also by a number of other chemicals such as acetic ether vapor, which acts practically as well as acetic acid but greatly impairs the flavor. Soaking some hours in a solution of potassium acetate stimulates the process in a very marked way but ammonium acetate has very little effect. Potassium sulphate shows no action. Oxalic acid shows a slight effect, while its homologue, succinic acid, has a very marked action. Benzoic and salicylic acids, and the acid amides (at least as regards acetamid) act promptly. The vapor of hydrochloric acid is without effect, but dates exposed to this acid for two days responded to acetic vapor. A detailed study of the effects of various groups of reagents is being made and the results will be published as soon as completed.

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NOTES ON THE PARASITISM OF *CYTODITES NUDUS*  
AND *HÆMAPHYSALIS CHORDEILIS*<sup>1</sup>

I. *Cytodites nudus*.

Among the many varieties of acariasis found in the United States, that produced by *Cytodites nudus* is comparatively rare. Furthermore, in the cases where *Cytodites* has been mentioned in this country, in Europe and in Australia, it has usually been described as a parasite of the trachea, lungs, air sacs and other respiratory passages of fowl and pheasants. Gerlach,<sup>2</sup> however, has attributed to it enteritis of poultry, and Zundel<sup>3</sup> considers these mites as the causative agents of enteritis and peritonitis, and Holzendorff<sup>4</sup> also found *Cytodites* embedded in the liver and kidneys of diseased fowls. It is the purpose of the present note to describe the conditions of infection observed by the writer in two cases of acariasis caused by *Cytodites nudus*, occurring in the yards of the Rhode Island Agricultural Experiment Station at Kingston.

The first case was that of a female golden pheasant. On December 21 it was observed that the bird was unable to walk, ate little, and showed a slight diarrhea. On December 22 a dose of castor oil was administered. From this time on the bird failed in strength, but lost very little flesh until it died on January 4, on which date the *post mortem* examination was made.

The internal organs were, as a whole, normal, except for the lungs, which were slightly congested. The heart was normal, though the most of the pericardial fluid appeared to have escaped into the thoracic cavity. Inside the pericardium, and on the surface of the heart itself, were a large number of round whitish bodies, about .5 mm. in diameter, which were recognized upon microscopic examination as identical with *Cytodites nudus*. Upon

<sup>1</sup> Contribution No. 6 from the Division of Biology of the Rhode Island Agricultural Experiment Station, Kingston, R. I.

<sup>2</sup> Gerlach, *Magazin für Thierheilkunde*, Berlin, 1859.

<sup>3</sup> Zundel, *Journ. de Med. Veterinaire*, Lyons, 1864.

<sup>4</sup> Holzendorff, *Archiv für wissenschaft. und prakt. Theilk*, 1885.

further examination these organisms were found in the air sacs, being especially numerous in the interclavicular. Upon examining the abdominal cavity it was found that, while the proventriculus, gizzard, spleen, pancreas, ovaries, ceca, duodenum and small intestines were normal, the gall bladder was perforated at several points, so that the fluid had spread into the abdominal cavity. On the surface of the gall bladder, and on the surface of the liver, spleen, kidneys and intestines, as well as on the mesenteries and peritoneum, great numbers of *Cytodites* were found. It seems very probable that death was caused by these mites, which had, in this instance, perforated both the pericardium and the wall of the gall bladder.

The second case of infection with *Cytodites* was that of a fowl coming from a private poultry yard near the experiment station. This bird also had been sick for several days, and finally died on January 7. The conditions found upon *post mortem* examination were similar to those described above except for the fact that the gall bladder and the pericardium were not perforated, and the number of *Cytodites* clustered on the internal organs was much greater than in the case of the pheasant.

## II. *Hæmaphysalis chordeilis*.

Although members of the genus *Hæmaphysalis* have not been uncommon in the southern states, their occurrence in the northern states is far less common. While *Hæmaphysalis chordeilis* has been reported by Banks<sup>6</sup> as having been found on a nighthawk, caught at Milton, Mass., and from a turkey at Taftsville, Vt., there is no case on record in which this parasite has in a single locality increased in numbers so as to be a menace to the raising of domestic poultry. The purpose of the present note is to place on record a case of this sort occurring in June, 1909, at Norwich, Vt.

At this time the attention of the Rhode Island Agricultural Experiment Station was

<sup>6</sup>Nathan Banks, "A Revision of the Ixodidæ or Ticks of the United States," Bulletin No. 15, Bur. Entomol., U. S. Dept. Agriculture, 1908.

called to the case of Mr. A., of Norwich, whose turkeys were dying as the results of the parasitic attacks of a large tick. The writer secured specimens which were identified by Dr. Banks, of the Bureau of Entomology, and by Professor Barlow, of the Rhode Island State College, as *Hæmaphysalis chordeilis*. Further data regarding the outbreak are given below:

The ticks were first observed by Mr. A. in the later part of May, when his young turkeys were about one week old. Then the parasites were found especially in the region of the neck, where they seemed to do most of their biting and sucking. Most of the birds that were infested carried from seventy to eighty full-grown ticks, as well as many more immature forms. In order to rid his birds of the ticks, Mr. A. tried insect powders without avail. He then tried lard and kerosene oil, but found that it did no good; indeed, "when the ticks were put into it they lived for seven days." Finally he got rid of them by picking them off the young birds, but not until forty of a flock of forty-six young turkeys had died.

The source of this infection is not known. It appears probable, however, that it entered Mr. A.'s flock with turkeys which he bought early in the spring. Mr. A. had no fowls, so they could not have been the source of the trouble. The above hypothesis gains evidence from the fact that Mr. A. sold some of his recently purchased turkeys to a neighbor, in whose flock the ticks also subsequently appeared.

One interesting consideration in connection with the present case is that Dr. Banks reported *Hæmaphysalis* from Taftsville, Vt., only a few years ago. Mr. A. states that he never received any birds from Taftsville, but it is apparent that the interchange of poultry stock in Vermont gives ample opportunity for the dissemination of this destructive parasite.

In order to prevent further spread it would seem important that the center of infection be located and proper measures taken to stamp out the trouble before the parasite enters other regions of the state of Vermont, or is disseminated into adjoining states.

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