

Chicks with Large Thyroids Stand Heat Better, Beltsville Test Shows

Chicks with large thyroids resisted high temperatures better than those with small thyroids in four recent USDA tests at the Agricultural Research Center, Beltsville, Md. New Hampshire chicks especially bred for large thyroids didn't lose as much weight or die in such large numbers. This suggests that the thyroid is involved in protecting chicks against high temperatures.

The relationship between low environmental temperature and increased thyroid activity has long been known. But the exact role of the thyroid gland at all temperatures hasn't been clear. Tests by ARS poultry physiologist M. H. Conner, nutritionist Henry Menge, and agricultural engineer Hajime Ota were run to provide more information on thyroids of chicks exposed to temperatures above 95°F. Response of adrenal glands was observed. Body temperature and blood plasma pH changes were recorded in the test.

THE BASIC STUDY is contributing much to understanding how endocrine glands of chickens function under extreme environmental conditions.

Test chicks of both sexes were from two genetic lines of New Hampshire chicks especially bred for difference in thyroid size. All chicks were exposed to constant (24 hours a day) high temperatures in a poultry calorimeter. Temperature, humidity, and rate of airflow were controlled. Birds were kept on litter. In all tests but one, chicks were put in the calorimeter at hatching time and kept at the desired temperature for four weeks.

Incoming airflow was gradually increased in each test to allow for increase in respiratory and metabolic activity as chicks grew older. Birds were given 14 hours of light daily.

Chicks with small thyroids didn't do as well during tests as

chicks with large thyroids. For instance, small-thyroid chicks weighed less after exposure to constant 95°F, than large thyroid chicks. In another test where birds were exposed to constant 100°F, the small-thyroid birds had a higher mortality rate (33 per cent more) than large-thyroid birds. Surviving small-thyroid chicks had smaller body and thyroid weights and significant adrenal enlargement. There was no change in adrenal weight of surviving large-thyroid chicks.

SMALL-THYROID BIRDS also suffered much greater mortality when exposed to an initial high temperature of 105°F, which was gradually lowered to 100°F. However, the high temperatures reduced body growth and thyroid size of even the large-thyroid birds.

Some of the small-thyroid birds died when exposed to a gradually increasing temperature range of 75° to 95°F. Deaths occurred at the higher temperatures. Body and thyroid weight of surviving birds were lower, and body temperature went up. Blood-plasma pH values were not changed.

High temperatures depressed the development of the thyroid gland in both genetic lines. But the thyroid-size difference between genetic lines wasn't changed. Thus, thyroid activity appears important in protecting chicks against high temperature.

ASSAYS OF THYROID activity were performed on untreated chicks. Those with large thyroids were found to secrete more thyroxine than those with small thyroids. Tests don't show if increased activity is proportional to the

greater size of the glands or if it's a result of greater activity per unit of thyroid tissue. However, traced studies with radioactive iodine indicate the increased activity is a function of the thyroid mass.

The extent to which any gland is involved in response to any stress apparently depends upon the condition to which animals are exposed, and how other glands are involved.

For instance, high temperatures affected the size of the adrenal gland in only one test — when birds were exposed to constant 100°F. But it is known from tests elsewhere on unselected chicks that the adrenals enlarge consistently when the birds are forced to exercise to exhaustion. The thyroid gland may be more important than the adrenal gland in helping chicks resist death from too much heat. The adrenal gland, however, is more important in other cases.

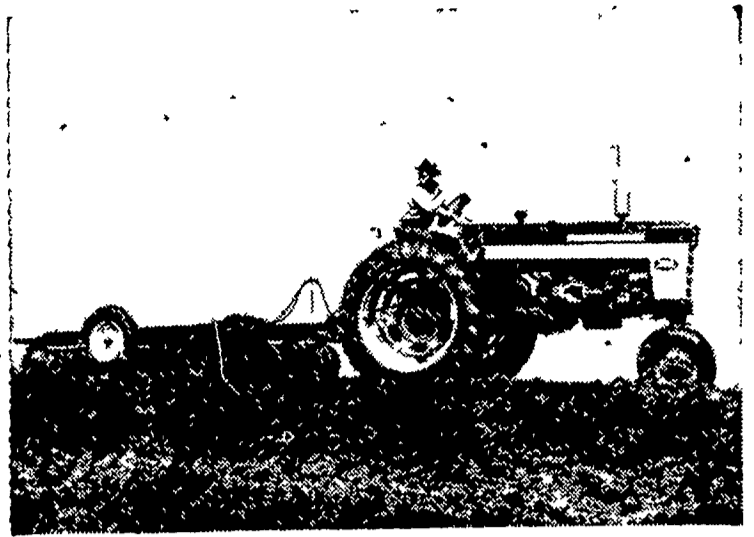
Studies are planned to clear up the role of the endocrine organs in chickens subjected to extremes of humidity and certain air impurities.

Fink Is Vo-Ag Chief Assistant to be Derr

James E. Fink, vocational agriculture adviser for Beaver, Lawrence and Butler counties was named director of vocational agriculture for the State Department of Public Instruction on August 1. He succeeds H. C. Fetterolf who retired to his Columbia County farm last year after serving in the department for 49 years.

Fink, who lives at Newcastle, RD taught vocational agriculture in Indiana county before taking over the supervisory post more than 10 years ago.

George Derr, who has been acting chief since Fetterolf's retirement, will become assistant in the department.



The International Harvester dealers of Lancaster county, recently joined 8,500 dealers and company sales personnel from every part of the United States and Canada for the introductory showing of Harvester's new line of farm and commercial wheel tractors. Changes in styling and design of the new tractors is indicated by this five-plow, six-cylinder Farmall 560, Largest of the line.

Fertilizer Value Not Dependent on Solubility

Whether or not a mixed fertilizer dissolved in water has little if any effect on crops.

To test the value of water soluble plant foods, experimental plots have been treated with mixed fertilizers of varying ability to dissolve in water and seeded to barley.

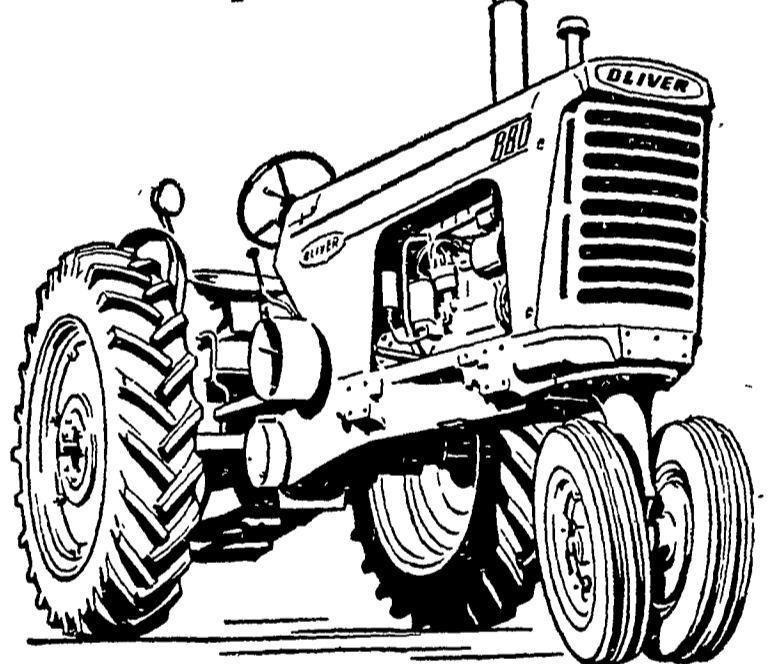
Despite considerable discussion on the subject of water soluble fertilizers, the important thing is that plants get the needed nutrients whether or not they dissolve in water.

Check Cleanliness Of Milk Equipment

Salt is used in a simple test to determine the cleanliness of stainless steel milking equipment, says Chester County Agent Robert A. Powers, Jr.

The test consists of first wetting the stainless steel surface and then sprinkling common ordinary table salt on the wetted surface. If the salt remains where it was put and does not run off or dissolve, the equipment is clean. If the salt dissolves, runs out in solution, the equipment is not clean.

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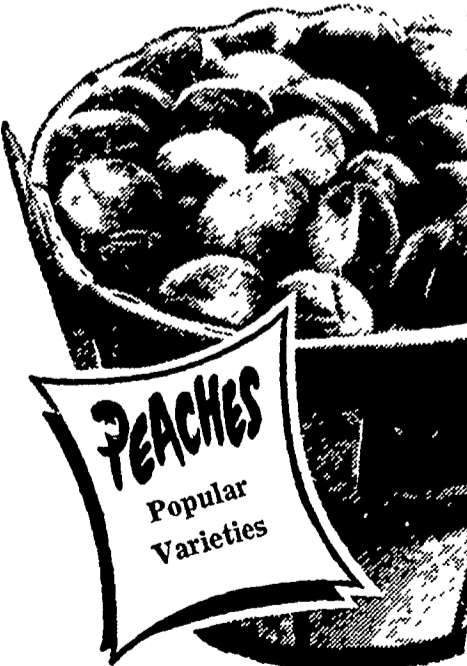
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