Chick Shipping Boxes

should keep brooding temperature as chicks can withstand chilling better than overheating

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Shipping boxes for baby chicks must serve a dual purpose.

The boxes provide a convenient way of handling the day-old chicks and should maintain the proper brooding conditions for the chicks in transit. These conditions should extend from the time the chicks leave the incubator until they are ready to be placed under a brooder.

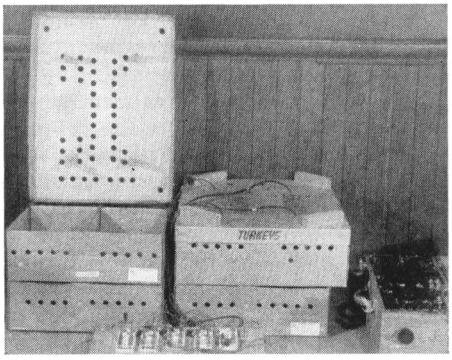
Studies at Davis for the past three years started out to determine the proper number of 5/8-inch plugs to remove from the standard 100 size chick box when filled with chicks and exposed to air temperatures of 39° F, 70° F, and 100° F. From this start other problems have arisen and subsequently been investigated.

It was found possible to calculate the number of holes to open at the various temperatures. The outside dimensions of a winter size chick box are 22″ × 18″ × 5½″. A chick box is divided vertically into four equal compartments. During a test each compartment was filled with 25 chicks. The temperature inside the box's compartment was measured with thermocouples. It was possible to determine the location of the chicks in the box by these temperature readings. In a cold room the chicks would crowd to the inside corners of the compartments; in a warm room they would spread out uniformly.

Overheating

It was observed that the chicks suffered more from overheating than from chilling. This suggested the use of a larger box during hot weather, to eliminate the excess metabolic heat produced by the chicks. The temperature readings showed this to be true. The chicks raised the temperature inside a chick box by 2½° F to 4½° F more than the same number of chicks raised the temperature in a poult box. When two boxes are tied together for shipping, as is the common practice, the upper box had a slightly higher internal temperature.

The time of exposure was a factor, when chick boxes were subjected to low environmental temperatures. To a slight extent, the chick responded to its environment like a cold-blooded animal. There was a definite limit to the cold that they could stand. In some tests the baby chicks were able to remain in a 40° F room for six hours without suffering serious mortality during the exposure or the week following. No doubt a longer period of exposure would have caused higher mortality.



Equipment used in determining the effect of temperature inside chick and poult boxes. Wires lead to thermocouples inside boxes.

Most chick mortality in chick boxes occurs at high environmental temperatures. This can be overcome by using either larger boxes, fewer chicks per box or punching out more plugs. From the tests it was not certain whether the higher mortality experienced when chicks in boxes were exposed to high room temperatures resulted from poor ventilation or from the increased heat within the box.

It may logically be assumed that at high temperatures the chicks use up more oxygen and produce more carbon dioxide. A gas analyzer was used to test the concentration of these two gases under normal—70° F—and under high—90° F to 100° F—room temperatures. It was necessary to seal the chick boxes with tape and to restrict the number of plugs removed to one per compartment. It was shown that oxygen, while reduced slightly below the content of normal air, was still ample to meet the needs of the chicks. Likewise there was an accumulation of carbon dioxide but not in sufficient amounts to be harmful to the chicks.

There was a steady rise in the temperature inside the boxes when kept in a room at 100° F. The chicks would die if kept as long as three hours under these conditions—with practically no ventilation. Temperatures inside the box in excess of 106° F were shown to be lethal.

In commercial shipment of chicks it was possible—by the use of temperature granules which are crystals with a definite melting point of 107° F—to determine if this temperature was exceeded during shipment.

Overheated chicks continued to show mortality during the first week of brooding. The tests also showed slower weight gains during the first week.

Transport Problems

The problem of ventilating chick boxes to control the temperature would be simple if the boxes remained in a constant environment. Since this is not possible in practice, the following may be used as a guide: when the room temperature is below 90° F it is not necessary to remove more than one or two plugs per compartment; when the room temperature is over 90° F all plugs may be removed. A room temperature of over 90° F is also proper brooding temperature so the only function of the box is to provide a convenient means of handling chicks. It would be safer and more economical if planes or trucks used in transporting chicks were heated to not over 70° F during cold weather. Cooling of these planes and trucks is also a problem during hot weather. The problem is more serious when the carriers are not in motion.

With the problem of ventilating chick boxes, one has to take into consideration daily variations and regional differences in temperature. For example, chick boxes shipped to Hawaii would have to be treated differently than chick boxes shipped to colder areas. The chick box may be affected by other weather conditions such as sunshine and wind. Local areas of heat such as stoves and radiators may cause the inside temperature to become excessive. A well-meaning individual may cover a shipment of baby chicks with a tarpaulin to protect them from the wind only to find the chicks dead from overheating.

The tests indicate the chicks' ability to withstand a rather wide range of environmental temperatures makes their shipment less hazardous than might be expected.

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