FATTY LIVER-HEMORRHAGIC SYNDROME
(FLHS; Fatty Liver Syndrome)

OCCURRENCE

Fatty liver-hemorrhagic syndrome (FLHS) is a sporadic disease with worldwide distribution that occurs primarily in caged layers. Outbreaks are most common in high-producing flocks during hot weather.

HISTORICAL INFORMATION

Fatty liver syndrome was first reported in 1956 and was soon observed by many other diagnosticians. The appearance of the syndrome coincided with the practice of confining layers to cages. There has been much speculation as to the cause of the syndrome. In 1972, the syndrome was reproduced experimentally by force-feeding hens. The lesions closely resembled those of the natural disease. This appears to be a multifactorial problem.

ETIOLOGY

1. Excessive consumption of high-energy diets combined with restricted activity is believed to result in excessive fat deposition in the liver.
2. Contributing factors may include a genetic component.
3. The syndrome may be caused by a deficiency of lipotropic agents, which are necessary for mobilization of fat from the liver.
4. Aflatoxin in laying hen diets has been shown to increase fat content (dry weight basis) approximately 20% over controls and may play a contributing role.
5. FLHS and caged layer fatigue are often diagnosed simultaneously.

CLINICAL SIGNS

Outbreaks of FLHS are often associated with a sudden drop in egg production (from 78-85% to 45-55%). The flock overall may be obese (body weights 25-30% above normal). Some birds may have pale combs and wattles covered with flaking epidermis. Mortality increases moderately with occasional hens in full production dying suddenly and unexpectedly. Often hens are found dead with pale heads. Mortality rarely exceeds 5%.

LESIONS

Dead birds have large blood clots in the abdomen, often enveloping the liver, as a result of subcapsular hepatic hemorrhage and rupture of the parenchyma. Subcapsular hematocysts may be visible within the parenchyma. Liver is generally enlarged, pale, and friable. Fat content in livers generally exceeds 40% dry weight and may reach 70%, hence the yellow coloration. Clinically healthy birds in the same flock may also have hematomas in the liver, either dark red (recent) or green to brown (older). Large amounts of fat are present within the abdominal cavity and surrounding the viscera.

TREATMENT

There has been no clear elucidation of dietary causes of FLHS other than excessive caloric intake. Reducing obesity of laying hens is the only successful preventive measure to date. However, further loss of production may result from diet changes during the laying cycle. Lipotropic agents such as vitamin E, vitamin B12, methionine and choline have been widely used with variable results. Management practices that reduce heat stress and minimize mold growth in feed may also be helpful. Results of feeding particular nutrients or formulations of nutrients to treat FLHS are inconsistent.