

**11. Sign: Chicks hatch late.**

**Causes:**

- a. Large eggs.
- b. Old breeders.
- c. Eggs stored too long (40 min. increase in incubation time/day of storage, .5% to 1.2% decrease in number hatched/day of storage).
- d. Incubator temperature too low.
- e. Weak embryos.
- f. Inbreeding.
- g. Incubator humidity too high.

**12. Sign: Slow, protracted (drawn-out) hatch.**

**Causes:**

- a. Mix in the incubator of eggs stored for long and short periods (1.2% loss of hatch/day of storage when all eggs set at the same time; only .5% loss/day when eggs stored for long periods are set earlier to allow a longer incubation period).
- b. Mix of eggs from young and old breeders.
- c. Mix of large and small eggs.
- d. Improper egg handling.
- e. Hot or cold spots in incubator or hatcher.
- f. Incubator or hatcher temperature too high or too low.
- g. Room ventilation system improper; high positive pressure or low negative pressure. Such pressures may alter incubator or hatcher ventilation.

**13. Sign: Trays not uniform in hatch or chick quality.**

**Causes:**

- a. Mix of large and small eggs.
- b. Mix of eggs from young and old breeders.
- c. Mix of eggs from different strains or breeds.
- d. Some eggs stored much longer.
- e. Lack of uniform ventilation in setter or hatcher.
- f. Disease or other stress in one or more breeder flocks.
- g. Variation in egg storage procedures among flocks.

**14. Sign: Sticky chicks; chicks smeared with albumen.**

**Causes:**

- a. Low incubation temperature.
- b. High incubation humidity.
- c. Improper turning. This results in reduced embryonic membrane growth and reduced nutrient absorption.
- d. Old eggs.
- e. Very large eggs.

**15. Sign: Chicks stuck in shell, dry; chicks with shell fragments stuck to down feathers.**

**Causes:**

- a. Humidity too low during egg storage, incubation, and/or hatching.
- b. Improper egg turning.
- c. Cracked eggs or poor shell quality.

**16. Sign: Premature hatching; bloody navels.**

**Causes:**

- a. Incubator and/or hatcher temperature too high.

**17. Sign: Small chicks.**

**Causes:**

- a. Small eggs.
- b. Low humidity during egg storage and/or incubation.
- c. High incubation temperature.
- d. High altitude. Hatcheries at high altitudes (>1,500 m or 4,920 ft) may need to adjust for low humidity, carbon dioxide, and oxygen. Atmospheric pressure <600 mmHg (~1,830 m or 6,004 ft) reduces growth and metabolic rate, increases loss of water from the egg.
- e. Thin, porous shells.

**18. Sign: Unhealed navel; dry, rough down feathers.**

**Causes:**

- a. High incubator temperature or wide fluctuations in temperature.
- b. Low temperature in hatcher.
- c. Humidity too high in hatcher or not lowered when hatching complete.
- d. Inadequate breeder nutrition.