

## 7993 C

## Inability of Testicular Hormone to Masculinize Plumage and Eye-Color of Female Brewer's Blackbird.\*

C. H. DANFORTH AND JEROME K. FISHER.

*From the Department of Anatomy, Stanford University.*

Attention has recently been called to a relation between testicular hormones and some secondary sexual or "ambosexual" characters in several avian species, but it is still too early to say how widespread the observed reactions may be. In the English sparrow, Keck<sup>1</sup> has found the color of the beak an excellent indicator of the amount of testicular hormone circulating in the blood, while the plumage is not such an indicator; van Oordt and Junge<sup>2</sup> find that in one of the gulls a testicular hormone is necessary for development in the male of colors in bill and feet which are found in both sexes during the breeding season; and Gallagher, Domm and Koch<sup>3</sup> report that injection of purified testicular extract restores the plumage of Sebright capons to its normal form and color. In light of these findings, and since plumage and eye-color of the male blackbird (*Euphagus cyanocephalus*) seem to be unaffected by the injection of theelin,<sup>4</sup> it was thought desirable to see if secondary sexual characters in the females of this species would respond to the male hormone.

The substance used for the purpose was an extract prepared from beef testes by the procedure of Gallagher and Koch.<sup>5</sup> Following the final acetone extraction, the material was in each case evaporated to a thick paste and injected directly or first taken up in olive oil. It proved to be somewhat irritating to blackbirds but was readily tolerated by capons on which it was tested and in which it produced the expected effects on comb and plumage.

Three tests were made on adult females weighing about 60 gm. each: one in July, just after the breeding season; one in August; and one in March. Untreated males and females were kept as con-

---

\* Supported in part by a grant from the Rockefeller Fluid Research Fund to the Stanford University School of Medicine.

<sup>1</sup> Keck, Warren N., *J. Exp. Zool.*, 1934, **67**, 315.

<sup>2</sup> van Oordt, G. J., and Junge, G. C. A., *Acta brevia, Neerl.*, 1933, **3**.

<sup>3</sup> Gallagher, T. F., Domm, L. V., and Keck, Fred C., *J. Biol. Chem.*, 1933, **100**, xlvii.

<sup>4</sup> Danforth, C. H., and Price, John, *Proc. Soc. Exp. Biol. and Med.*, 1935, **32**, 675.

<sup>5</sup> Gallagher, T. F., and Koch, Fred C., *J. Biol. Chem.*, 1929, **84**, 495.

trols. The former are prevailingly blue-black with nearly white irises, the latter rusty black with dark brown irises. Injection into the pectoral muscles of the test females was begun from 6 to 10 days after dull feathers had been plucked from regions of the head and neck which are iridescent black in the male. The preparation employed for the first 2 tests was assayed by the capon method before and after these tests. From June 27 to June 30 a capon weighing about 1660 gm. was given 1.2 cc. of undiluted extract in 4 daily doses of .3 cc. each. By July 3 his comb had increased in length from 47.5 mm. to 57 mm., and in height from 20 mm. to 31 mm., after which it slowly regressed. From August 21 to August 25 this capon received a total of 1.1 cc. of the same extract, following which measurements of the comb showed an average increase of 24%, indicating no great loss of potency during this time. A female blackbird was given .15 cc. of the extract on July 12, and from .15 to .30 cc. on July 13, 14, 17, 19, 20, 21, 28, 31 and August 2. The total was 2.35 cc. No effect on eye-color or plumage was detected. A second series of injections was begun on August 20, at which time all the birds of both sexes were moulting. A total of 1.5 cc. of extract was administered in 5 injections given twice daily. The bird did not survive this treatment but at the time of death showed no change in eye-color (or plumage).

In March a new extract diluted in oil was used, of such potency that 12 cc. in 3 injections during 50 hours gave a 26% increase in comb measurements of a 1780 gm. capon and 8 cc. in 2 injections during 21 hours gave a marked effect on developing feathers of a 900 gm. Sebright type capon. This extract was administered to 3 female blackbirds, only one of which survived in good condition till final conclusions could be drawn. This bird received 1 cc. on the first day, 2 cc. (in separate doses) on the second, 2 cc. on the third and .5 cc. on the fourth, a total of 5.5 cc. No effect of this treatment on plumage or eye-color was detected.

In the first of these tests the amount of extract administered in 3 different sequences, *viz.*, July 12-14, July 19-21 and probably July 28-August 2, was in each case at least half as much as would have been necessary to produce an effect on a capon about 27 times as heavy, and on a few occasions during this period single doses were absolutely as great as those which produced an effect on such a capon. In the third test the dosage was at least 10 or 12 times as great in proportion to weight as that which had produced a marked influence on the tested capons. Failure to get results with the blackbirds is probably not due to inadequate dosage. It is possible, how-

ever, that some factor, such as inability to absorb this particular extract, is responsible for the negative findings, but it seems more probable that sexual differences in plumage and eye-color of this species have been differentiated with reference to factors other than the primary sex hormones.

## 7994 C

**Antifibrinolytic Titer of Commercial Antistreptococcus Serums.\***

J. K. VAN DEVENTER. (Introduced by W. H. Manwaring.)

*From the Laboratory of Bacteriology and Experimental Pathology, Stanford University, California.*

Twenty-eight commercial antistreptococcus serums† have been titrated for their neutralizing power (a) against the specific anti-human streptococcus fibrinolysin of Tillett and Garner,<sup>1</sup> and (b) against the two antiveterinary streptofibrinolysins of Madison.<sup>2</sup> The highest serial dilution of each antiserum completely neutralizing an arbitrary fibrinolytic dose of the selected streptococcus filtrates was taken as its approximate titer. Data thus obtained are recorded in Table I.

The table shows that each of 3 animal species tested is relatively immune to the homologous streptofibrinolysin, but has only minimum humoral defenses against the 2 heterologous streptolysins.

The titers of the specific antisera suggest that only 6 (21%) of the 28 serums tested are of sufficiently high antifibrinolytic content to serve as effective passive antifibrinolytic immunizing agents in man.‡ But 2 (7%) of them would be similarly effective with horses. None of the antisera would have a predictable antifibrinolytic immunizing value for domestic swine.

It is of interest that the 7 "refined" and "concentrated" anti-

---

\* Work supported in part by the Eli Lilly and Co. Streptococcus Research Fellowship of Stanford University and in part by the Rockefeller Fluid Research Fund of the Stanford Medical School.

† These antisera were kindly furnished by: Eli Lilly and Co.; The Cutter Laboratory; Parke, Davis and Co.; Lederle Laboratories; and E. R. Squibb and Sons.

<sup>1</sup> Tillett, W. S., and Garner, R. L., *J. Exp. Med.*, 1933, **58**, 485.

<sup>2</sup> Madison, R. R., *Proc. Soc. Exp. Biol. and Med.*, 1934, **32**, 444; 1933, **32**, 641.

‡ So far as known there is no parallelism between the antifibrinolytic titer and therapeutic value of antistreptococcus serums. (W. H. M.)