

Effects of speed on pheasant gaits and hindlimb joint angles

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Abstract

When studying the gait of pheasants, an intermittent-flight bird, it is necessary to take into account changes in the gaits and hindlimb joint angles resulting from increases of speed. In this study, pheasant locomotion postures were recorded on a speed-variable treadmill with high-speed cameras. Firstly, kinematic analysis showed that the stride cycle of pheasants decreased and the stride length increased with increasing speed. The duty factor also decreased, but was less than 0.5 in only about 10% of measurements. Thus, pheasants are more inclined to choose the grounded running or walking gait in laboratory situations. Secondly, changes in the tarsometatarso–phalangeal joint angle and the intertarsal joint angle at touch-down, mid-stance and lift-off concomitant with speed variation were studied. Tarsometatarso–phalangeal joint angle was found not to be significantly affected by changes in speed, but changed over larger ranges than the intertarsal joint angle. Thirdly, the continuous changes in the joint angles were studied during a complete stride cycle. The curves shifted leftward with increasing speed. Finally, the changes at four main positions were analyzed with increasing speed.

Keywords

Gait transition; ITJ; joint angle; locomotion speed; pheasant; TMTPJ

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Supplementary material

Table S1. Raw data of fig. 2.

Table S2. Raw data of fig. 4.

Table S3. Raw data of fig. 5.

Table S4. Raw data of fig. 6.

Video S1. Test video of pheasant locomotion at speed of 0.3 m s⁻¹.

Video S2. Test video of pheasant locomotion at speed of 1.0 m s⁻¹.

Video S3. Test video of pheasant locomotion at speed of 1.7 m s⁻¹.