

# O10-3 Stages in the evolution of the foot in jacanas (Jacanidae)

Andrei V. Zinoviev

*Tver State Univ., Zoology Dept., Chaikovskogo pr., 70, 170002, Tver, Russia, p000258@tversu.ru*

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In the order Charadriiformes, jacanas comprise a small family of lily trotters, all members of which possess a remarkably elongated hallux. This digit is either much reduced or completely lost in other members of the order. To find out whether the hallux in jacanas has elongated secondarily or been retained unreduced from ancestral charadriiforms, we dissected the foot of the American Jacana *Jacana spinosa* and reviewed available literature on the subject. Surprisingly, the hallux of the jacana was found to have lost its connection with *M. flexor hallucis longus*, the main flexor of the hallux in other birds. Its function was replaced by *M. flexor hallucis brevis*, the insertion of which was shifted distally. In other charadriiforms, the reduction of the hallux is also usually accompanied by loss of connection with *M. flexor hallucis longus*, together with some persistence of the connection with *M. flexor hallucis brevis*. Judged by this shared configuration, it seems likely that the charadriiform lineage ancestral to modern jacanids also had a much reduced hallux. In it, *M. flexor hallucis longus* had lost its connection with the hallux while that of *M. hallucis brevis* still persisted. Mastering life on floating plants, the new foraging and breeding zone of evolving jacanas, required radical expansion of the area of contact between foot and floating substrate to prevent the birds from sinking. The necessary expansion was achieved by extraordinary elongation of toes and claws, including the ancestrally reduced hallux; and *M. flexor hallucis brevis*, the only flexor of the hallux operational at that time, took the full responsibility for flexion of the secondarily-elongated hallux. In doing so, it changed its insertion distally, to complete its functional substitution for *M. flexor hallucis longus*.