

Abstract Submitted  
for the DFD08 Meeting of  
The American Physical Society

**A quantitative study of the adhesive locomotion of terrestrial gastropods** JANICE LAI, ROBERT SHEPHERD, JUAN CARLOS DEL ALAMO, JUAN C. LASHERAS, University of California San Diego — The locomotion of terrestrial gastropods exhibits unique characteristics which allow these soft-body animals to crawl while adhering to steep surfaces. Gastropods move by gliding over a ventral foot lubricated by a thin layer of mucus. They generate trains of pedal waves through periodic muscle contractions in the central portion of the ventral foot, producing a forward traction, while the rim of the foot glides over the substrate. We analyzed the kinematics and dynamics of locomotion by conducting two sets of experiments. In the first set, we used digital image processing techniques to correlate the frequency and wavelength of the pedal waves to the migration velocity. In the second set, we computed the spatial and temporal evolution of the traction forces transmitted across the thin lubricating layer from measurements of the deformation of an elastic substrate of known properties and calculate the mechanical work used for crawling. We found that the pedal waves accelerate as they move forward along the ventral foot producing a breaking in symmetry which could contribute to the generation of a net traction force.

Juan C. Lasheras  
University of California San Diego

Date submitted: 05 Aug 2008

Electronic form version 1.4