Anatomical changes in leaves of *Piper aduncum* L. under different irradiances

Fernanda Ventorim Pacheco[1,*], Ana Clara Reis Trancoso[2], Ivan Caldeira Almeida Alvarenga[1], Amauri Alves Alvarenga[3], Marinês Ferreira Pires Lira[3]

[1]Laboratório de Cultura de Tecidos Vegetais e Plantas Medicinais, Departamento de Agricultura, Universidade Federal de Lavras, 37200-000, Lavras, Brazil

[2]Departamento de Fitotecnia, Universidade Federal de Viçosa, Campus Universitário 36570900, Viçosa, Brazil

[3]Laboratório de Crescimento e Desenvolvimento Vegetal, Setor de Fisiologia Vegetal, Departamento de Biologia, Universidade Federal de Lavras, 37200-000, Lavras, Brazil

**Correponding author: fventorimpacheco@yahoo.com.br*

ABSTRACT

The aim of the study was to evaluate the effect of different light conditions on the internal structure of *Piper aduncum* L. leaves. *P.aduncum* seedlings were grown for 4 months under different light conditions achieved with shading nets (50, 70, and 100% of luminosity) and with photoconversion nets in red (RN) and blue (BN) colors. Two fully expanded leaves located at the third node were collected from five plants per treatment for paradermal and transverse sections. In the paradermal sections, stomatal density, polar and equatorial diameters, the ratio between polar and equatorial diameters, and trichome density on the abaxial and adaxialsurfaces of the epidermis were evaluated. In the transverse sections, the thickness of the adaxial and abaxial epidermis, cuticle of the adaxial surface, palisade and spongy parenchyma, and leaf blade were assessed. The vessel elements parameters were also evaluated and Carlquist vulnerability index were measured. The results show that *P. aduncum* changes the internal structure of its leaf when grown under different radiation conditions. It presented greater epidermis thickness,

greater stomatal density and smaller diameters of vessel elements, anatomical characteristics favorable to its growth under high irradiances.

Keywords: Monkey pepper, Ecological anatomy, Luminosity, mesophyll.

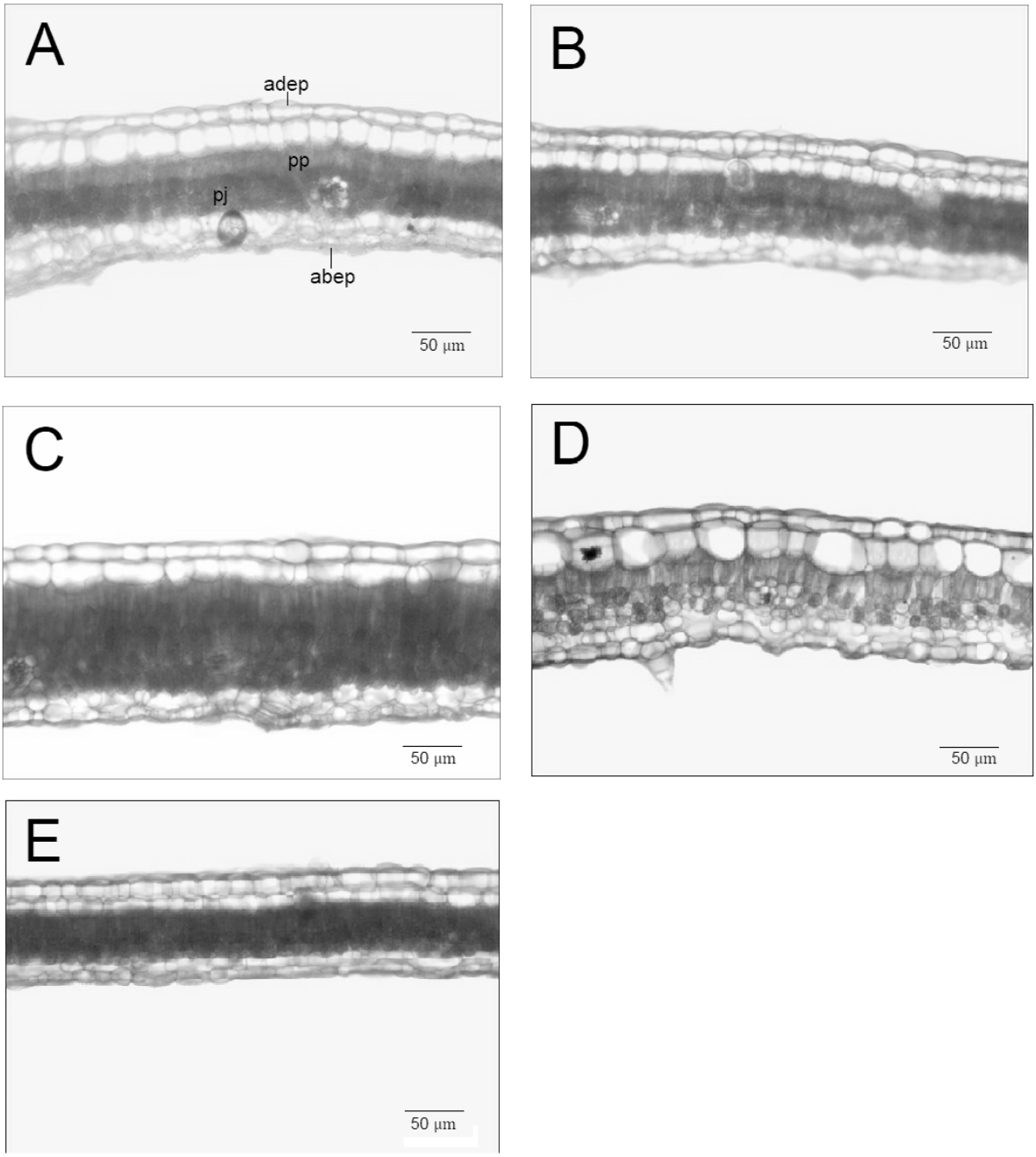

Figure S1. Cross-sectional views of the leaf blade of *Piper aduncum* cultivated under different irradiance conditions. A. Photomicrograph of plants cultivated under 50% irradiance; B. Photomicrograph of plants cultivated under 70% irradiance; C. Photomicrograph of plants cultivated under 100% irradiance; D. Photomicrograph of plants cultivated under red net (RN); F. Photomicrograph of plants cultivated under blue net (BN). Legend: Adaxial epidermis (ead); abaxial epidermis (eab); palisade parenchyma (pp); spongy parenchyma (pj).

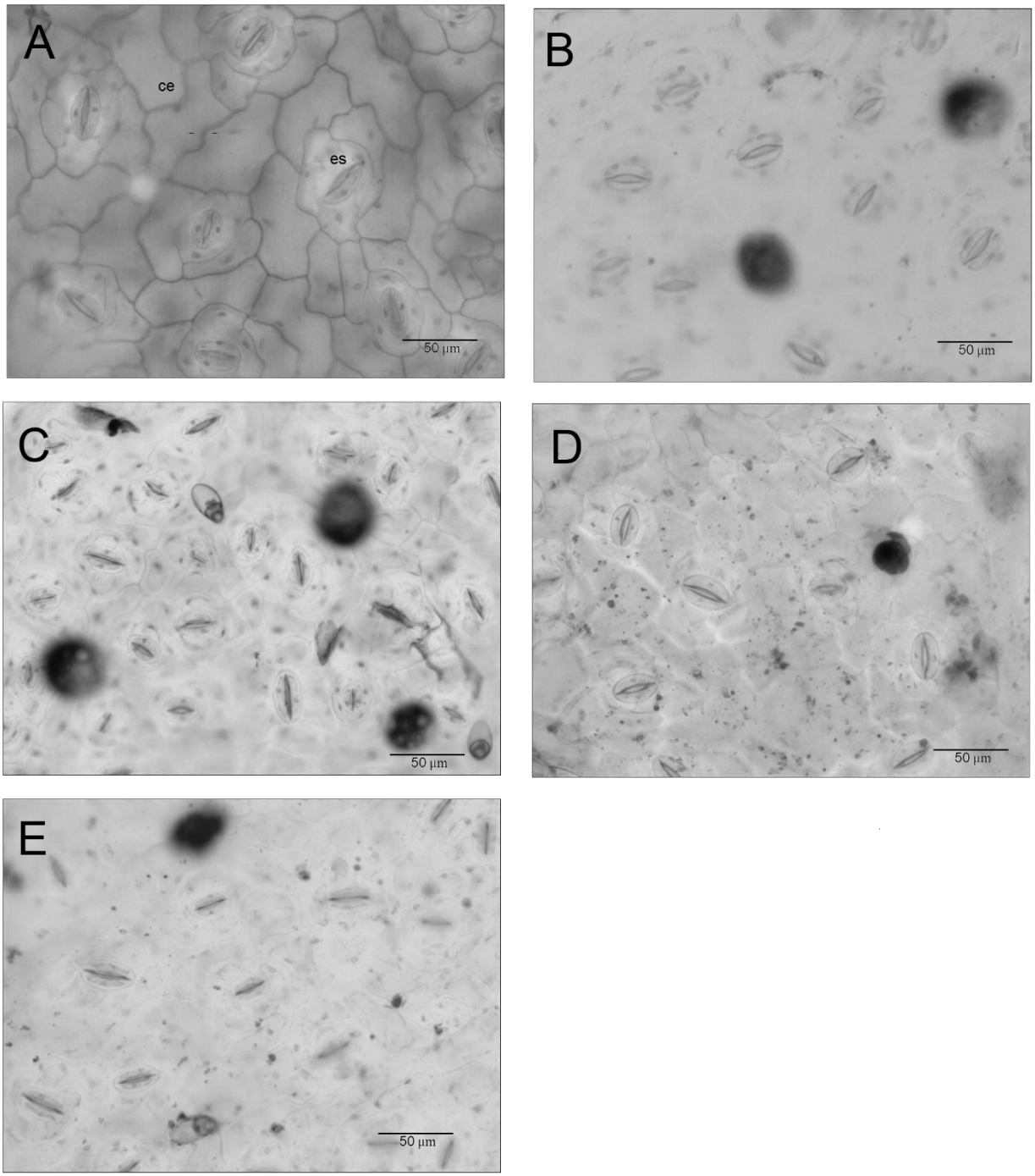

Figure S2. Frontal view of the abaxial epidermis of *Piper aduncum* highlighting the stomatal density. A. Photomicrograph of plants cultivated under 50% irradiance; B. Photomicrograph of plants cultivated under 70% irradiance; C. Photomicrograph of plants cultivated under 100% irradiance; D. Photomicrograph of plants cultivated under red net (RN); F. Photomicrograph of plants cultivated under blue net (BN). Legend: Epidermal cell (ce); stomata (es).

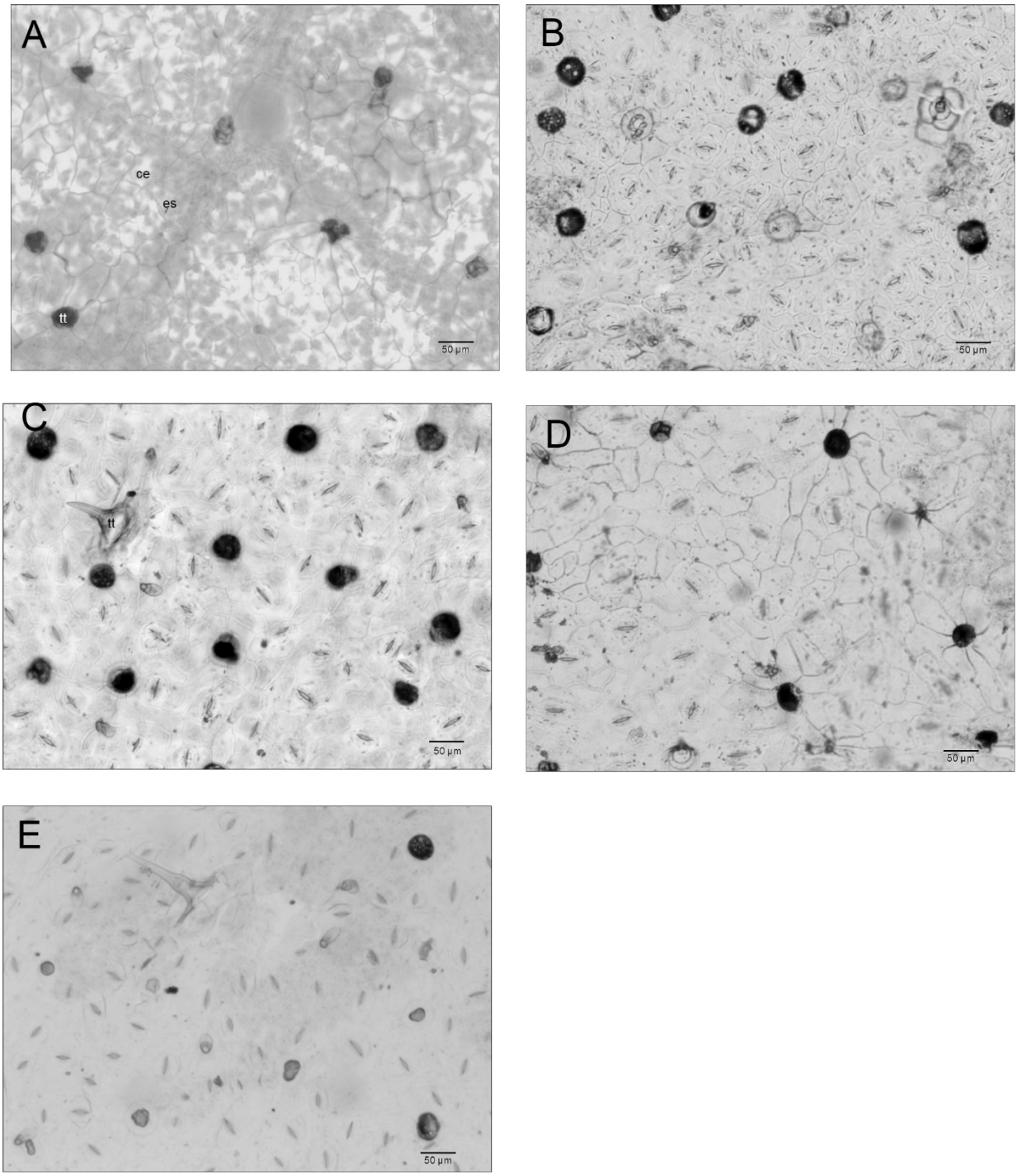

Figure S3. Frontal view of the abaxial epidermis of *Piper aduncum* highlighting the tector and glandular trichomes. A. Photomicrograph of plants cultivated under 50% irradiance; B. Photomicrograph of plants cultivated under 70% irradiance; C. Photomicrograph of plants cultivated under 100% irradiance; D. Photomicrograph of plants cultivated under red net (RN); F. Photomicrograph of plants cultivated under blue net (BN). Legend: Epidermal cell (ec); stomata (es); tector trichomes (tt).

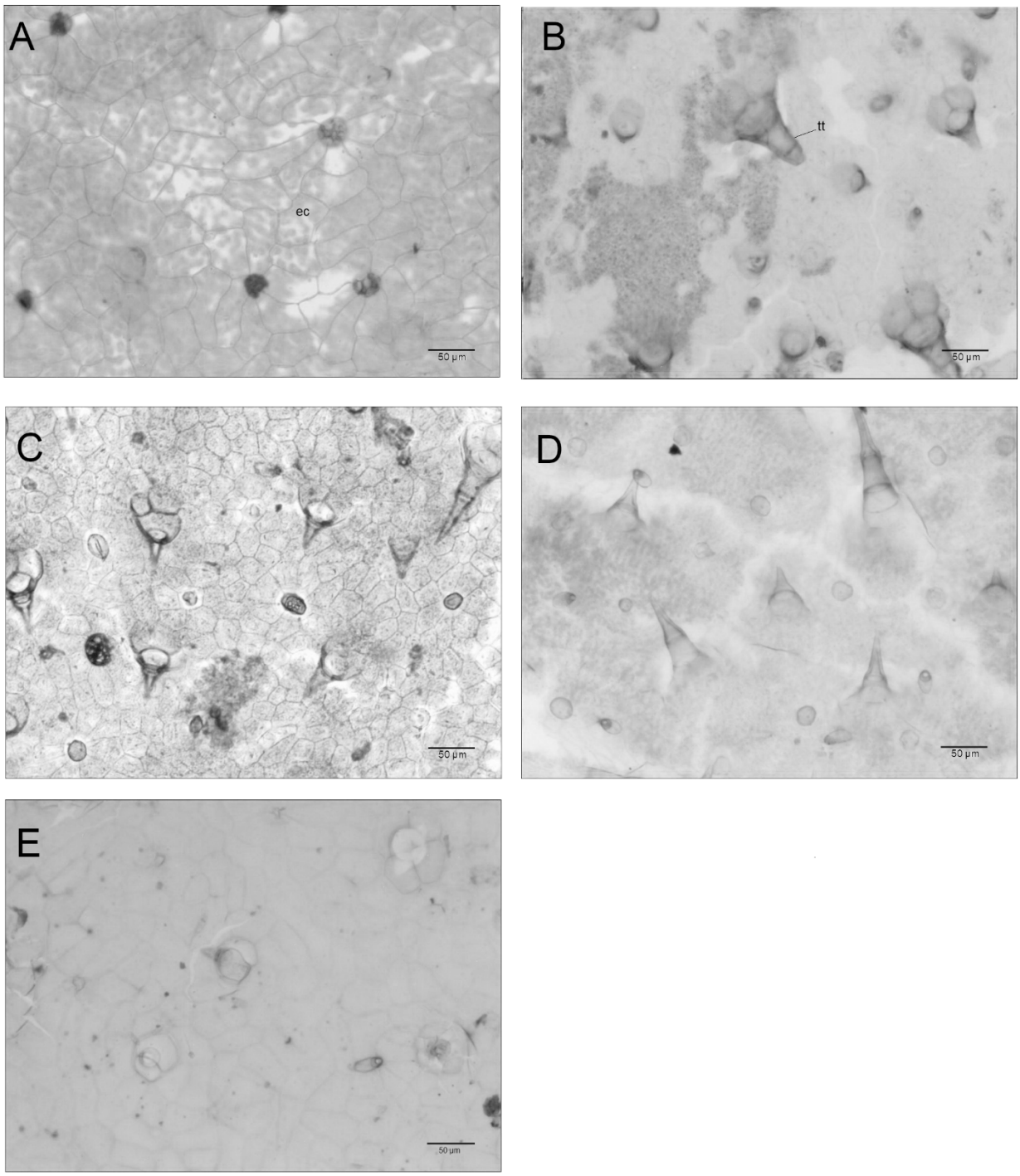

Figure S4. Frontal view of the adaxial epidermis of *Piper aduncun* highlighting the tector and glandular trichomes. A. Photomicrograph of plants cultivated under 50% irradiance; B. Photomicrograph of plants cultivated under 70% irradiance; C. Photomicrograph of plants cultivated under 100% irradiance; D. Photomicrograph of plants cultivated under red net (RN); E. Photomicrograph of plants cultivated under blue net (BN). Legend: Epidermal cell (ec); tector trichomes (tt).

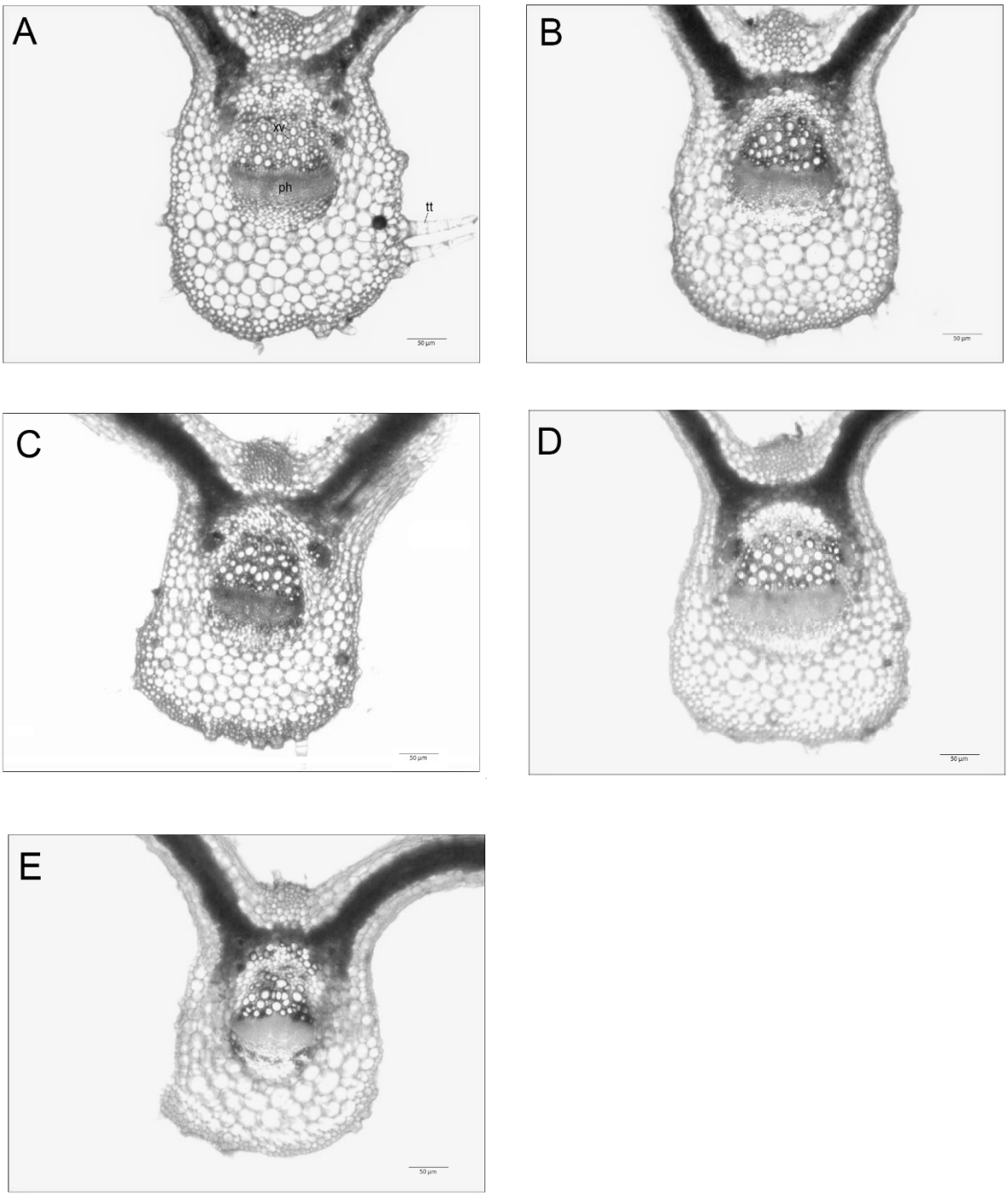

Figure S5. Cross-sections of the central vein highlighting the xylem and phloem vessels of *Piper aduncu*m cultivated under different irradiance conditions. A. Photomicrograph of plants cultivated under 50% irradiance; B. Photomicrograph of plants cultivated under 70% irradiance; C. Photomicrograph of plants cultivated under 100% irradiance; D. Photomicrograph of plants cultivated under red net (RN); E. Photomicrograph of plants cultivated under blue net (BN). Legend: Xylem vessels (xv), phloem (fl), tector trichomes (tt).