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A PHARMACOGNOSTICAL STUDY OF IRIS GERMANICA L. VAR. ALBA

PART II: A Pharmacognostical Study of the Inflorescence

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The macro and micromorphological characters of the inflorescence was carried out with view of finding out the diagnostic features for the purpose of identification either in the entire or in the powdered form.

MACROMORPHOLOGY

The inflorescence (Fig. 1) is scorpioid cyme, it is a 2-flowered terminal head. It is carried on a greenish leafless stem or scape which measures 25 to 40 cm long, 0.4 to 0.6 cm in diameter at its middle part and up to 0.7 cm at its base. The inflorescence is protected by large leathery spathacious bracts. The spathe (Fig 1 D) is deciduous, sessile folded and ovate in shap. The outer surface is greenish in colour while the inner one is of pale green colour. They are traversed longitudinally with parallel veins and measure about 3 to 4 cm long and 1.5 to 2 cm wide at the middle.

The flower is almost pedicellate, white in colour and has a fragrant odour and a disagreeable taste. It is actinomorphic, hermaphrodite, tetracyclic and epigenous. The flower measures about 3 to 7 cm long and 7 to 10 cm in diameter. The

pedicel is cylindrical , externally smooth, green in colour and measures 0.2 to 0.3 cm long and 0.3 to 0.5 cm in diameter. Perianth (Fig. A, B &C) is petaloid consists of 6 delicate segments arranged in two alternate whorls, the 3 outer segments are reflected and the 3 inner ones are narrowed to a distinct claw. The segments are united at the base. The perianth segments are white in colour and is traversed by several parallel slender yellow veins. They are obovate in shape and having entire margin and retuse apex. The outer segments measure about 6-8 cm long and 2.5-3 cm wide at the middle portion. They are beared with long yellow hairs . The inner segments measure about 5.6-6.5 cm long and 3-3.5 cm wide at the middle portion.

The androecium (Fig. 1) consists of 3 epipetalous stamens in one whorl. Each stamen consists of a simple filament and a narrow anther. The filaments are long, flat white in colour and measuring about 1.5-2 cm long to 3-4 mm in diameter. The gynaecium (Fig. 1 F) is inferior, consisting of tricarpellary, trilocular syncarpous ovary and a flattened branched and winged petaloid style. The anthers are over-arched by the style arms which carry their stigmas as thin lips beneath the apices of the arm. The ovary is green in colour, smooth, ribbed and measures about 1.2-1.5 cm long and 0.5-0.7 cm in diameter. It contains few anatropous ovules arranged on an axial placenta.

The floral diagram:

$$\oplus \quad , \quad \varphi \quad {}^{P}(3 + 3)\ {}^{A}3 + {}^{0} \quad , \quad {}^{G}(\overline{3})$$

MICROMORPHOLOGY

A- The Scape:

The transverse section in the scape (Fig. 2A) appears rounded in outline. The glabrous epidermis is followed by a peripheral zone of collenchyma, the rest of the ground tissue consists of parenchyma cells a complete ring of lignified fibres traversed the ground tissue. Numerous closed collateral vascular bundles are scattered in the ground tissue.

The epidermis (Fig 2 B) is formed of thin radial walled-cells which have thick inner and outer walls isodiametric to subrectangular cells, in surface view they are polygonal, axially elongated having straight anticlinal walls. They are covered with thick smooth cuticle, measure 240-520-600 u long 72-76-88 u high and 52-72-80 u wide. Stomata of anomocytic type are present. They are oval to rounded in shape and usually surrounded by 4 to 6 cells and measuring 88-100 -120 u in diameter. The ground tissue (Fig. 2 C) consists of an outer narrow zone of one or two rows of rounded to oval parenchyma cells. A continuous ring of lignified fibres are present. The fibres (Fig. 2 D) have wide lumina, acute or blunt ends. The fibre is from 40-45-50 u in diameter, 2000 -2500-3200 u long. Each vascular bundle (Fig. 2 C) is closed collateral consists of outer batch of phloem which consists of sieve tubes and companion cells and inner batch of lignified xylem vessels (Fig. 2 D) which have spiral, scalariform and annular thickening and measuring 16-56-88 u in diameter. Most of the large vascular bundles have a batch of lignified pericyclic fibres below the phloem. The fibres have wide lumina , lignified walls and an acute or blunt ends.

measuring from 600-700-800 u long and 18-20-25 u in diameter (Fig. 2 D).

B- The Bract:

A T.S. in the spatheous bract (Fig. 3A) shows glabrous outer and inner epidermises enclosing a narrow mesophyll tissue which is traversed by several closed vascular bundles.

The upper epidermis (Fig. 3 E) consists of polygonal subrectangular cells with straight anticlinal walls covered with thick, smooth cuticle, measuring 520-600-720 u long and 76-100-116 u wide and 44-52-60 u high. Stomata of anomocytic type are present being oval or rounded surrounded by 4 cells measuring 60-70-80 u in diameter.

The cells of the inner epidermis (Fig. 3 F) are polygonal, subrectangular but larger than that of the outer epidermis, measuring 640-720-800 u long and 156-168-240 u wide and 80-100-120 u high. The vascular bundles (Fig. 3 B) are closed collateral with an arc of pericyclic fibres. The fibres (Fig. 3 C) are lignified with wide lumen and may be with straight or tortuous margin and pointed, to rounded or acute apex. The fibres measure 800-1120-1680 u long and 32-56-76 u in diameter. The xylem is formed of a batch of lignified vessels which have spiral and annular thickening (Fig. 3 C) measuring 20-25-30 u in diameter. Styloids of CaOx are present in the ground tissue and measuring 200-300-400 u long (Fig. 3 D).

C- The Flower:

A transverse section of the flower stalk (Fig. 4 A) appears oval to rounded in outline, showing an epidermis and a distinct starch-sheath. Numerous closed collateral vascular

bundles are scattered in the ground tissue.

The epidermis (Fig. 4 C) consists of thin-walled, sub-rectangular cells, in surface view they are polygonal, axially elongated with straight anticlinal walls and covered with thick smooth cuticle. They measure 140-195-220 u long, 80-92-112 u wide and 40-44-52 u high. The ground tissue consists of several rows of rounded thin walled parenchyma with wide intercellular spaces. The starch sheath consists of 3-5 rows of polyhedral parenchymaous cells, thin walled and filled with starch grains. The starch granules (Fig. 4 E) are simple, rarely compound of 2 components. The simple granules are mostly rounded and the components are polygonal with rounded angles. They measure 6-8-12 u in diameter. The hilum is centric , distinct in few granules as a point. The vascular bundle is typical closed collateral, surrounded by an outer parenchymatous pericycle. Phloem is formed of an outer batch of sieve tubes and companion cells. The xylem (Fig. 5 D) is formed of inner batch of xylem vessels which have spiral and annular thickening and measuring 20-25-28 u in diameter.

II- The Outer Perianth:

A transverse section through the outer perianth (Fig. 5 A) is slightly concavo-convex, comprising an outer and inner epidermises, enclosing in between a mesophyll traversed by several vascular bundles.

The inner (upper) epidermis. The cells vary in shape at different regions of the inner surface. The cells of the apical region (Fig. 6 D) are polygonal in surface view, isodiametric with straight anticlinal walls, they measure from 120-160-180 u long and 100-150-200 u wide. At the middle (Fig. 6 E) the cells are polygonal in surface view and measure

104-120-200 u long and 120-180-220 u wide. At the basal part (Fig. 6 F) the cells are polygonal, axially elongated with straight anticlinal walls and measure from 160-260-340 u long and 80-100-120 u wide The inner epidermis is bearded with long stiff-hairs. The trichomes(Fig. 5 B) are numerous, only of non-glandular type. The majority are multicellular, pluriseriate formed of 15-25 cells long, ending with rounded apex. The cells specially at the top are filled with a yellow secretion. They are covered with smooth cuticle, measuring 2400-2600-2800 u long and 220-320-440 u in diameter. Non-glandular, multicellular, uniseriate hairs with notched or irregular apex are also present and measure from 160-300-400 u long and 40-60-80 u in diameter.

The outer (lower)epidermis at the apical region (Fig.6 A) is formed of polygonal , nearly isodiametric cells with more or less straight anticlinal walls. They measure 140-220-280 u long and 120-180-220 u wide.

At the middle (Fig. 6 B) the cells are polygonal, isodiametric with wavy anticlinal walls, they measure 50-80-100 u long and 80-100-120 u wide. The epidermal cells at the basal part (Fig. 6 C) appear polygonal, axially elongated, measuring 220-320-340 u long and 100-120-140 u wide and showing anomocytic stomata measuring 80-100-120 u in diameter. The cells are covered with thick, smooth cuticle.

The homogeneous mesophyll (Fig. 5 C) consists of rounded parenchyma with wide intercellular spaces, traversed by several collateral closed vascular bundles.

III- The Inner Perianth:

A transverse section through the inner perianth (Fig. 7 A) is concavo-convex showing an outer and inner epidermises

enclosing in between a narrow mesophyll traversed by numerous vascular strands.

The inner (upper) epidermis: The cells of the apical region (Fig. 7 D) are polygonal in surface view, axially elongated, thin walled with slightly wavy anticlinal walls. They measure 200-220-240 u long, 68-80-100 u wide and 64-72-80 u high. At the basal part (Fig. 8 F) they appear polygonal in surface view, axially elongated, thin walled with straight anticlinal walls. They measure 240-300-360 u long and 80-100-120 u wide. The cells are covered with thick smooth cuticle.

The outer (lower) epidermis: The cells of the apical region (Fig. 7 C) are polygonal in surface view, isodiamtric with distinctly wavy anticlinal walls, they measure 100-120-140 u long 88-100-120 u wide and 100-120-140 u high. At the basal part (Fig. 7 E) the epidermal cells appear polygonal in surface view, axially elongated, measure 320-400-480 u long. They show anomocytic stomata of 80-85-90 u in diameter. The cells are covered with thick smooth cuticle.

The homogeneous mesophyll (Fig. 7B) consists of rounded parenchyma with wide intercellular spaces. The mesophyll is traversed by several closed collateral vascular bundles.

IV- The Androecium:

The filament: A transverse section through the filament (Fig. 8 A) is nearly oval, flat, showing an epidermis surrounding a wide cortex and central vascular bundle.

The epidermis in surface view (Fig. 8 B) is formed of axially elongated cells having straight anticlinal walls and covered with thin striated cuticle. They measure 440-480-520 u long, 48-60-72 u wide and 72-80-88 u high. The cortical tissue (Fig. 8 C) is formed of nearly rounded parenchyma. The vascular bundles consist of small narrow spiral and annular

lignified vessels, measuring 20-25-30 u in diameter , and surrounded with a ring of phloem consists of sieve tubes and companion cells.

The anther: A transverse section in the anther(Fig.9 A) shows two equal lobes which are attached together by the connective which has a small vascular strand in the center. Each anther lobe is formed of one pollen sac containing pollen grains. The anther wall is formed of an epidermis, a fibrous layer of 1-4 rows.

The epidermal cells (Fig. 9 D) are polygonal in surface view, mainly isodiametric, sometimes slightly elongated with straight anticlinal walls, the cells are papillosed and covered with striated cuticle. The cells measure 120-140-160 u long 60-75-90 u wide and 80-90-100 u high. Anomocytic stomata are present and surrounded with 4-6 cells. The stomata measure 80-90-100 u in diameter. The fibrous layer (Fig.9 B & C) is formed of 1-4 rows of cells. The cells are radially elongated nearly isodiametric in surface view with distinct beaded walls and showing lignified bar-like thickening. They measure 120-140-160 u long 40-60-80 u high and 80-100-130 u wide. The pollen grains (Fig. 9 E) are spherical to subspherical or oval in outline with sculptured warty exine and one germinal furrow, measuring 240-260-320 u in diameter.

V- The Gynaecium:

The ovary: A transverse section in the ovary (Fig.10 A) is triangular in outline with rounded angles. It shows an epidermis enclosing the cortex with 3 locules, each locule contains 2 ovules. The ovary wall shows glabrous outer and inner epidermises enclosing a wide ground tissue formed of several rows of parenchyma and traversed by several vascular strands.

The vascular system consists of numerous closed collateral strands traversing the ground tissue. Each bundle is surrounded by parenchymatous pericycle. The phloem is formed of an outer batch of sieve tubes and companion cells. The xylem is formed of an inner batch of lignified vessels with spiral thickening;the vessels appear branched in the isolated elements (Fig. 10 G) measure 20-40-60 u in diameter.

The style: A transverse section of the style tube (Fig. 10 C) appears triangular with rounded angles. It shows epidermis,parenchymatous tissue and 3 flattened central vascular bundles .

The epidermis (Fig. 10 D) appears isodiametric in T.S. polygonal, axially elongated with straight anticlinal walls. measuring 340-400-460 u long, 32-48-60 u wide and 40-50-60 u high. The ground tissue consists of ordinary parenchyma with wide intercellular spaces. The epidermal cells of the style arm vary in shape at different regions. The cells of the inner epidermis of the style arm are similar to those of the outer epidermis. At the top, (Fig. 11 A) the cells are polygonal isodiametric with straight anticlinal walls, measure 80-100-110 u long, 88-95-104 u high and 60-72-88 u wide.The cells are covered with thin striated cuticle. At the middle (Fig. 11 B) the cells are larger, axially elongated, measure 160-180-220 u long and 60-80-100 u wide and covered with striated cuticle. At the basal part (Fig. 12 C) the cells are longer, measure 350-400-420 u long and covered with thin smooth cuticle.

The stigma: (Fig. 11 D)

The epidermal cells of the stigma are polygonal, isodiametric with straight anticlinal walls. The cells are distinctly papillosed. The papillae are oval in shape and long, measuring 120-160-200 u long and 70-80-90 u in diameter.

Powdered flower:

The dry flowers produce a whitish green powder with fa- iant aromatic odour and disagreeable taste. The diagostic microscopical characters are the following.

1- Fragments of the floral leaves showing polygonal isodiametric and elongated epidermal cells having straight or wavy anticlinal walls covered with thick , smooth cuticle occasionally showing anomocytic stomata.
2- Fragments of the anthers, showing polygonal, almost isodiametric anomocytic cells of the fibrous layer with lignified bar-like thickening.
3- Numerous pollen grains with warty exine.
4- Styloids of calcium oxalate, starch granules frequently, simple, usually compound of 2-3 components.
5- Fragments of xylem elements showing lignified spiral scalariform and annular vessels.
6- Fragments of lignified pericyclic fibres with wide lumina acute or blunt ends, or fibres with tortuous outline and rounded ends.
7- Fragments of the ovary surface composed of isodiametric cells with straight anticlinal walls covered with thin, smooth cuticle with anomocytic stomata.

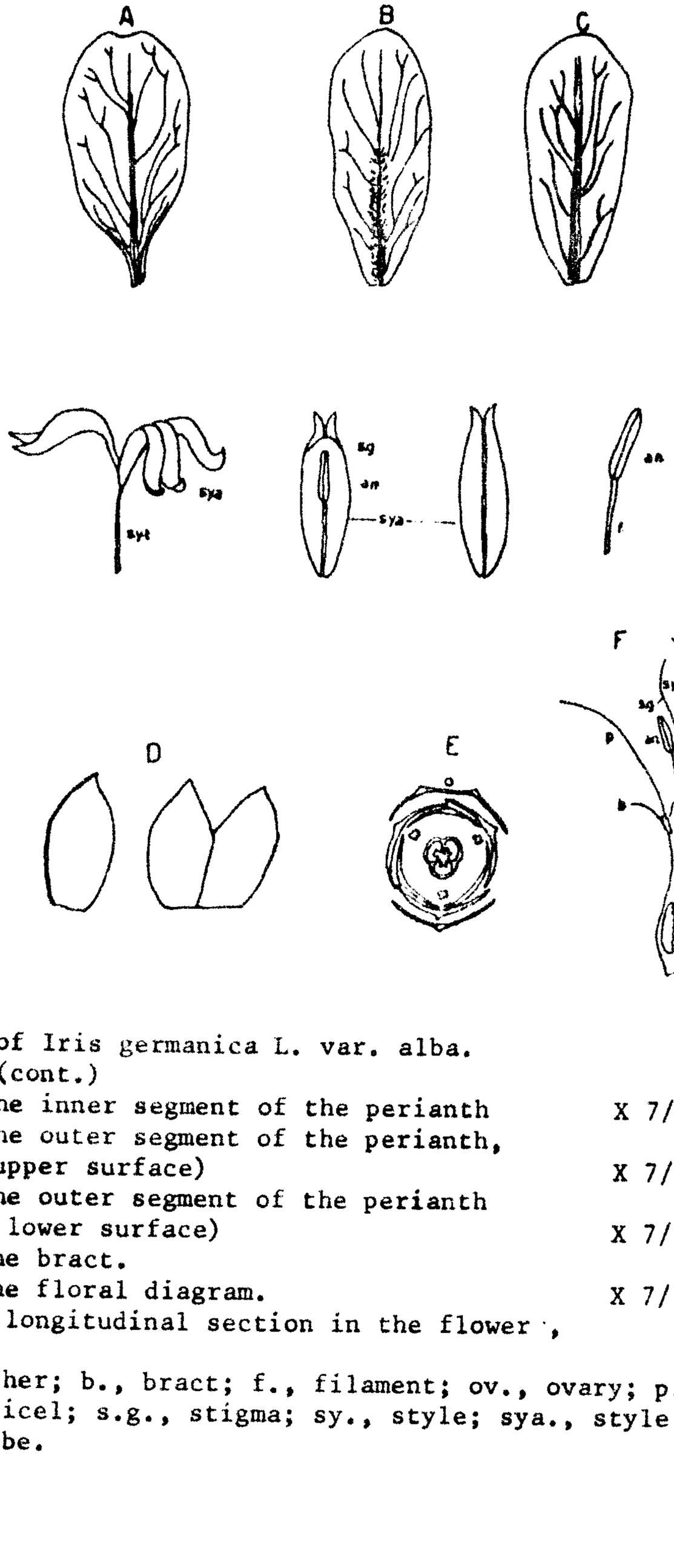


Fig. 1- Sketch of Iris germanica L. var. alba.
(cont.)

A.	The inner segment of the perianth	X 7/10
B.	The outer segment of the perianth, (upper surface)	X 7/10
C.	The outer segment of the perianth (lower surface)	X 7/10
D.	The bract.	
E.	The floral diagram.	X 7/10
F.	A longitudinal section in the flower ,	

an., anther; b., bract; f., filament; ov., ovary; p., perianth; pe., pedicel; s.g., stigma; sy., style; sya., style arm; syt., style tube.

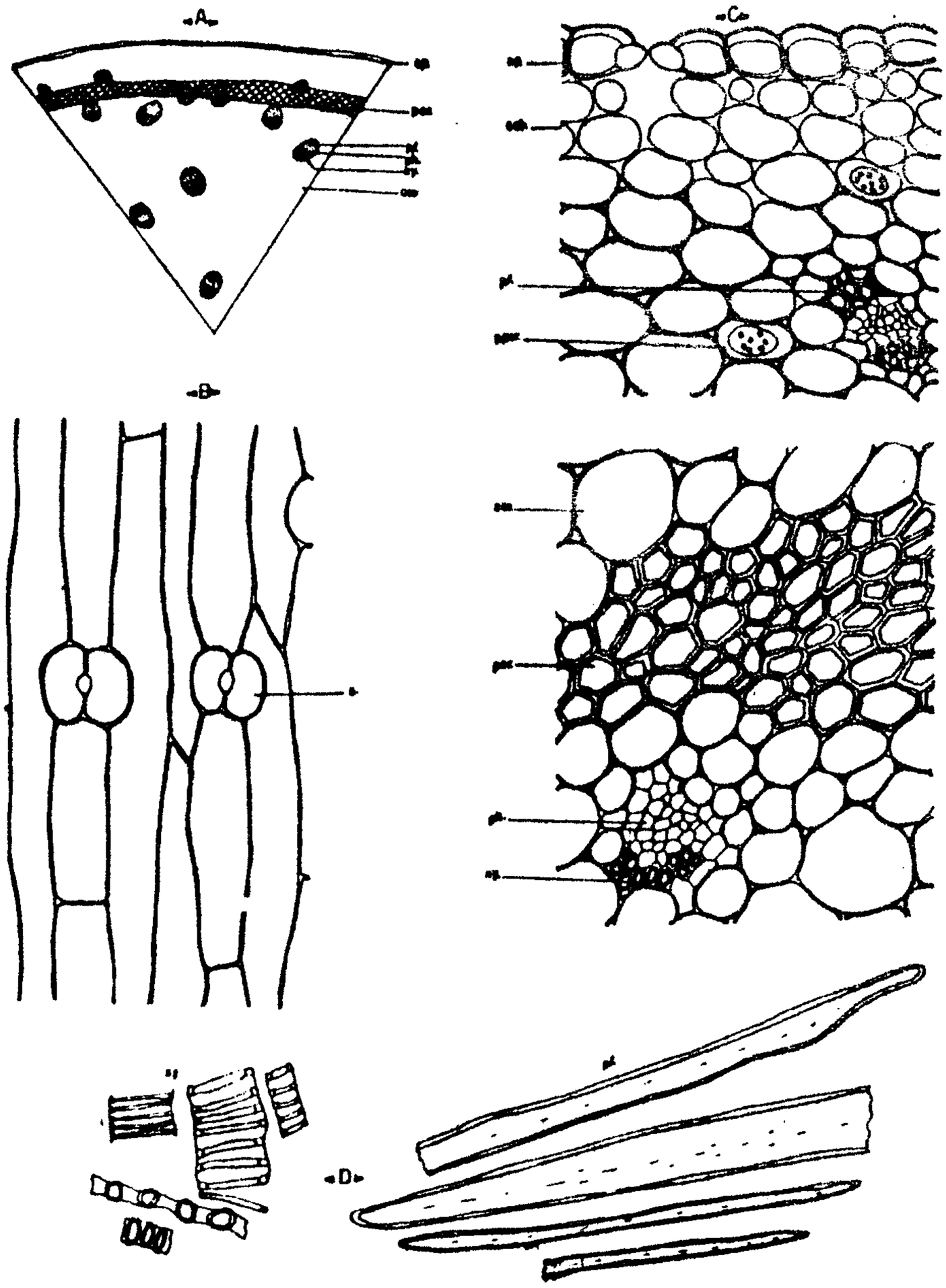


Fig. 2: The Scape

A-	Diagrammatic T.S. in the scape	X	30
B-	Epidermis of the scape	X	125
C-	Detailed T.S. in the scape	X	125
D-	Isolated elements	X	125

col., collenchyma; ep., epidermis; per., pericycle; ph., phloem; p.f., pericyclic fibres; ph., phloem; p. par., pitted parenchyma; s., stoma; xy., xylem.

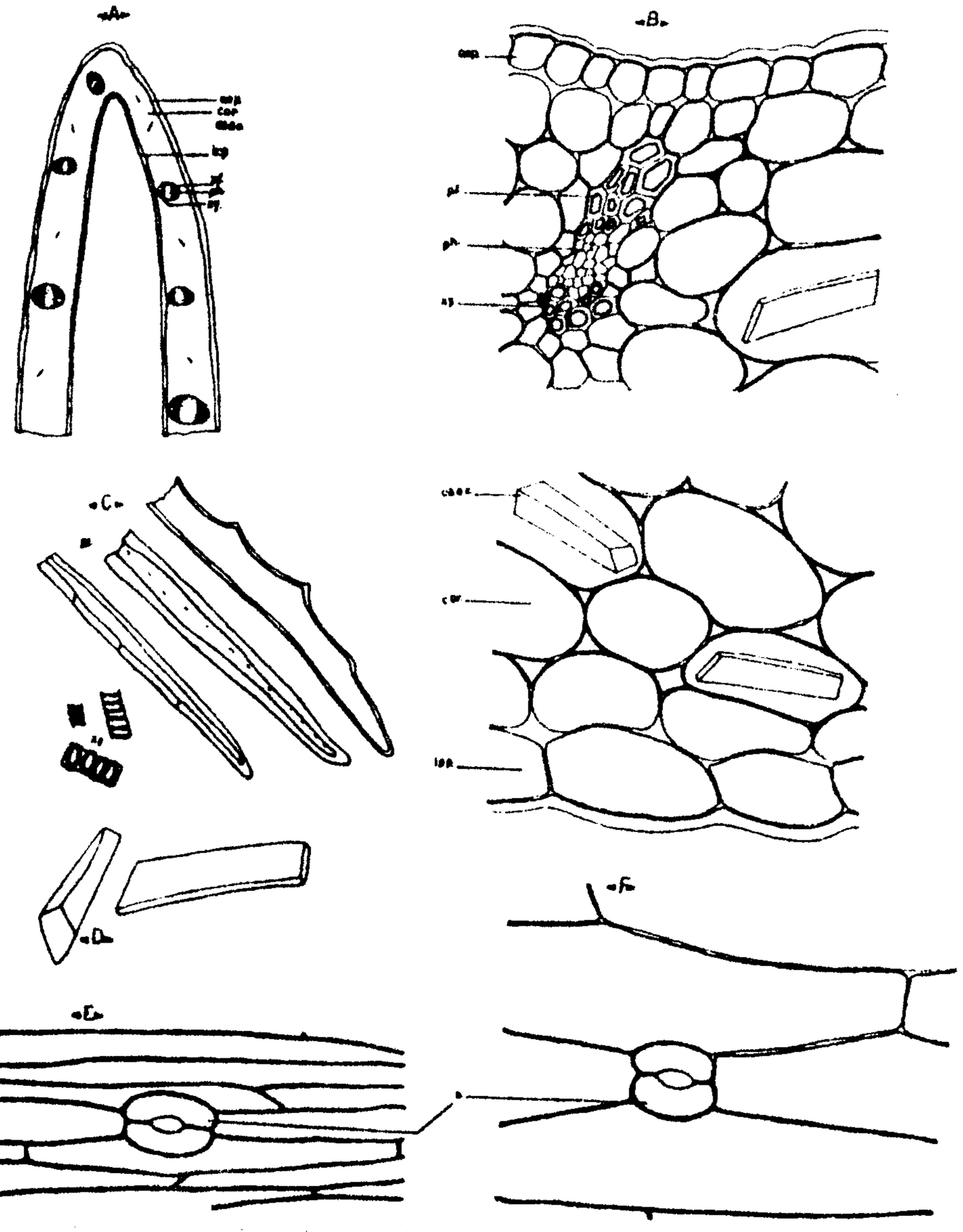
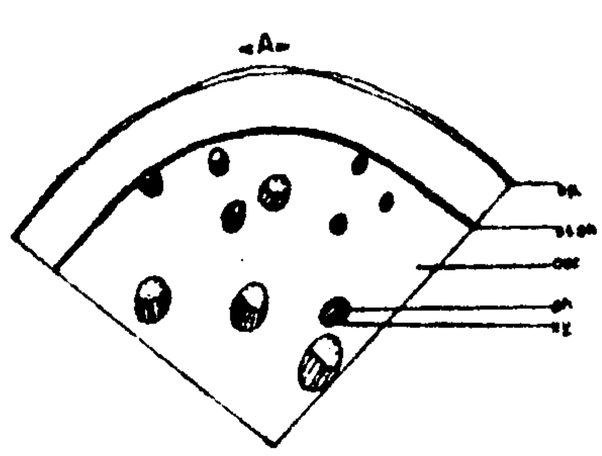
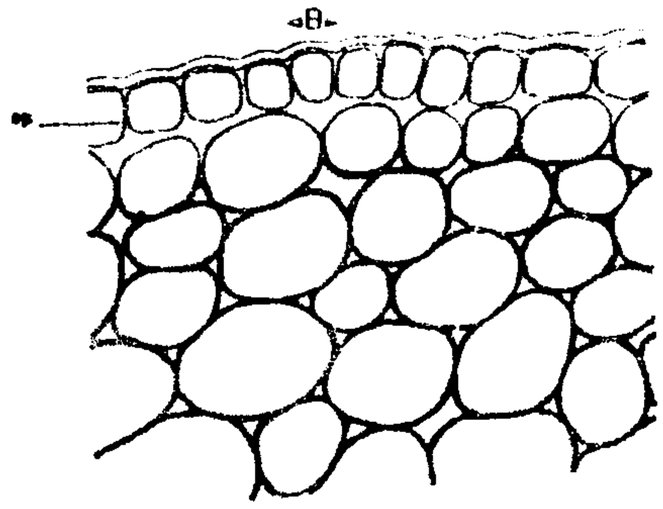


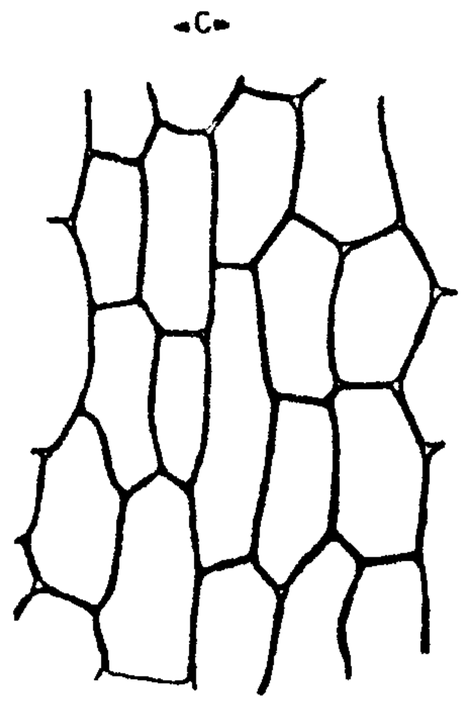
Fig. 3- The Bract

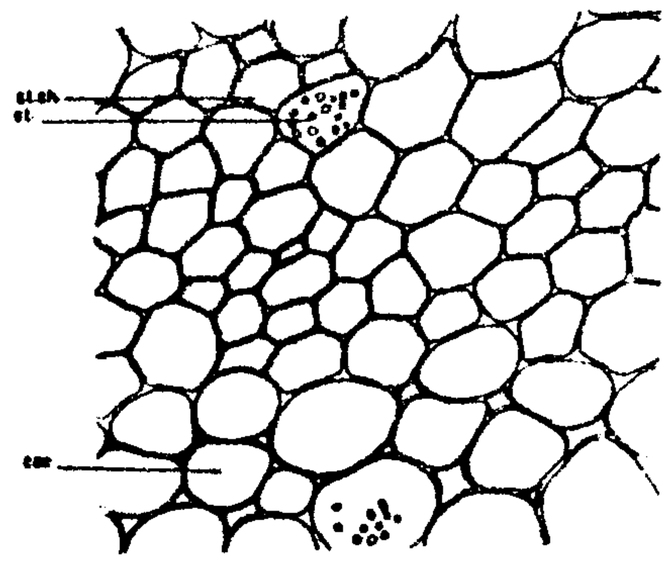
A.	Diagrammatic T.S. in the bract.	X 30
B.	Detailed T.S. in the bract.	X 125
C.	Isolated elements.	X 125
D.	Styloids of calcium oxalate.	X 125
E.	Outer epidermis.	X 125
F.	Inner epidermis.	X 125

ca. ox., calcium oxalate; cor., cortex; i.ep., inner epidermis; per., pericycle; ph., phloem; p.f., pericyclic fibres; o.ep., outer epidermis; s., stoma , xy., xylem.









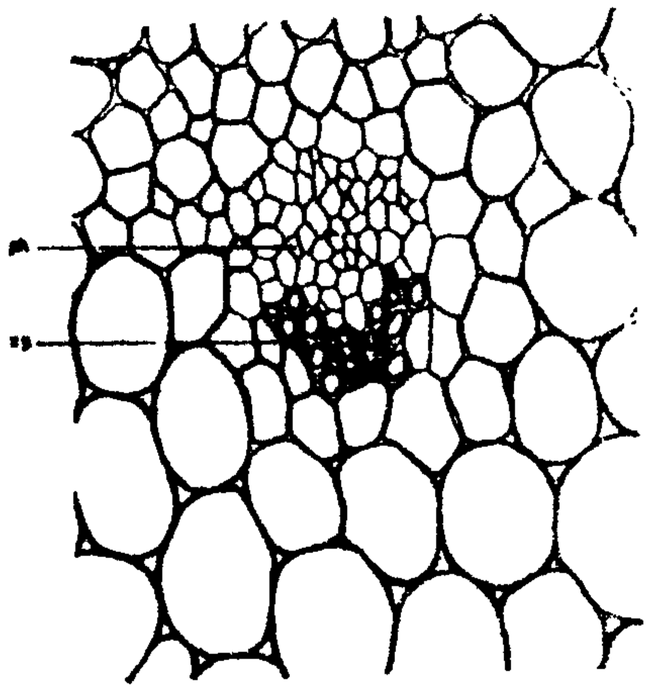


Fig. 4: The Pedicel

A-	Diagrammatic T.S. in the pedicel	X 30
B-	Detailed T.S. in the pedicel	X 125
C-	Epidermis of the pedicel	X 125
D-	Isolated elements	X 125

cor., cortex; st. sh; starch sheath; ep., epidermis; ph., phloem; st., starch granules; xy., xylem.

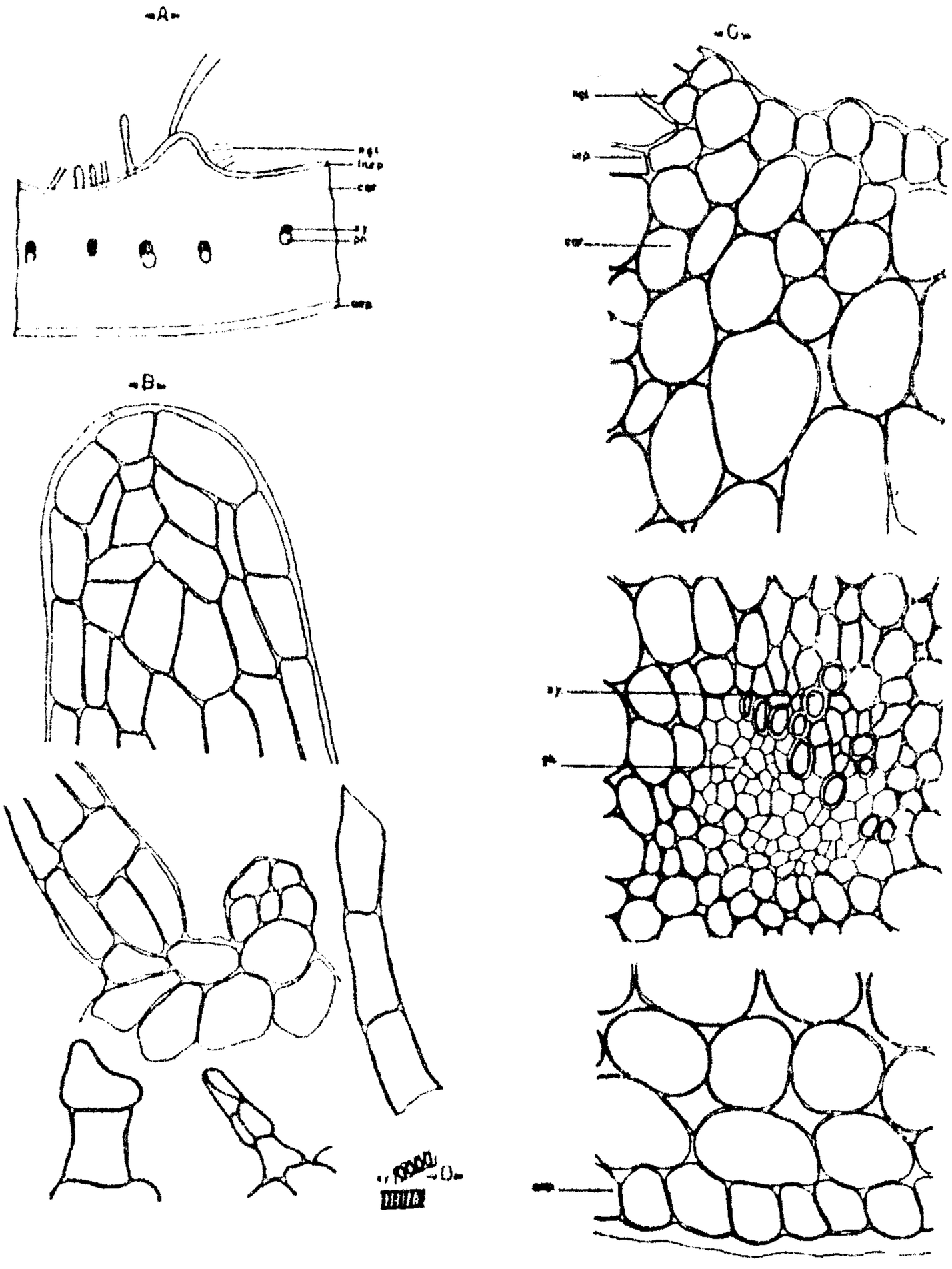


Fig. 5- The Outer Perianth

A.	Diagrammatic T.S. in a segment of the outer perianth	X 50
B.	Trichomes	X 125
C.	Detailed T.S. in a segment of the outer perianth	X 125
D.	Isolated elements	X 125

cor., cortex; i.ep., inner epidermis; n.g.t., non glandular trichomes; ph., phloem; o.ep., outer epidermis; xy., xylem.

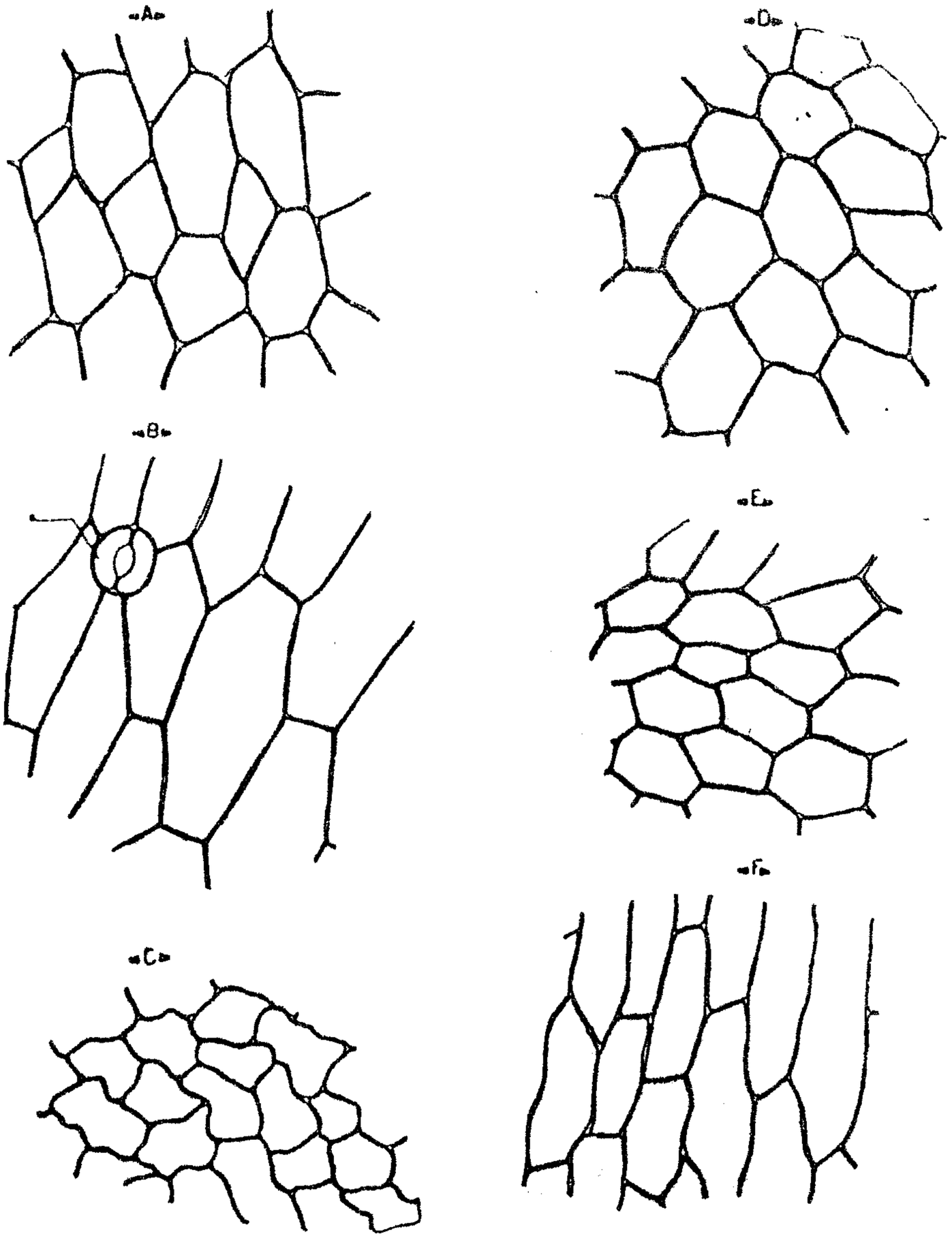


Fig. 6- Surface view of the Outer and Inner Epidermises of the Outer Perianth:

A. Apical region of the outer epidermis X 125
B. Middle region of the outer epidermis. X 125
C. Basal region of the outer epidermis. X 125
D. Apical region of the inner epidermis. X 125
E. Middle region of the inner epidermis. X 125
F. Basal region of the inner epidermis. X 125

s., stoma;

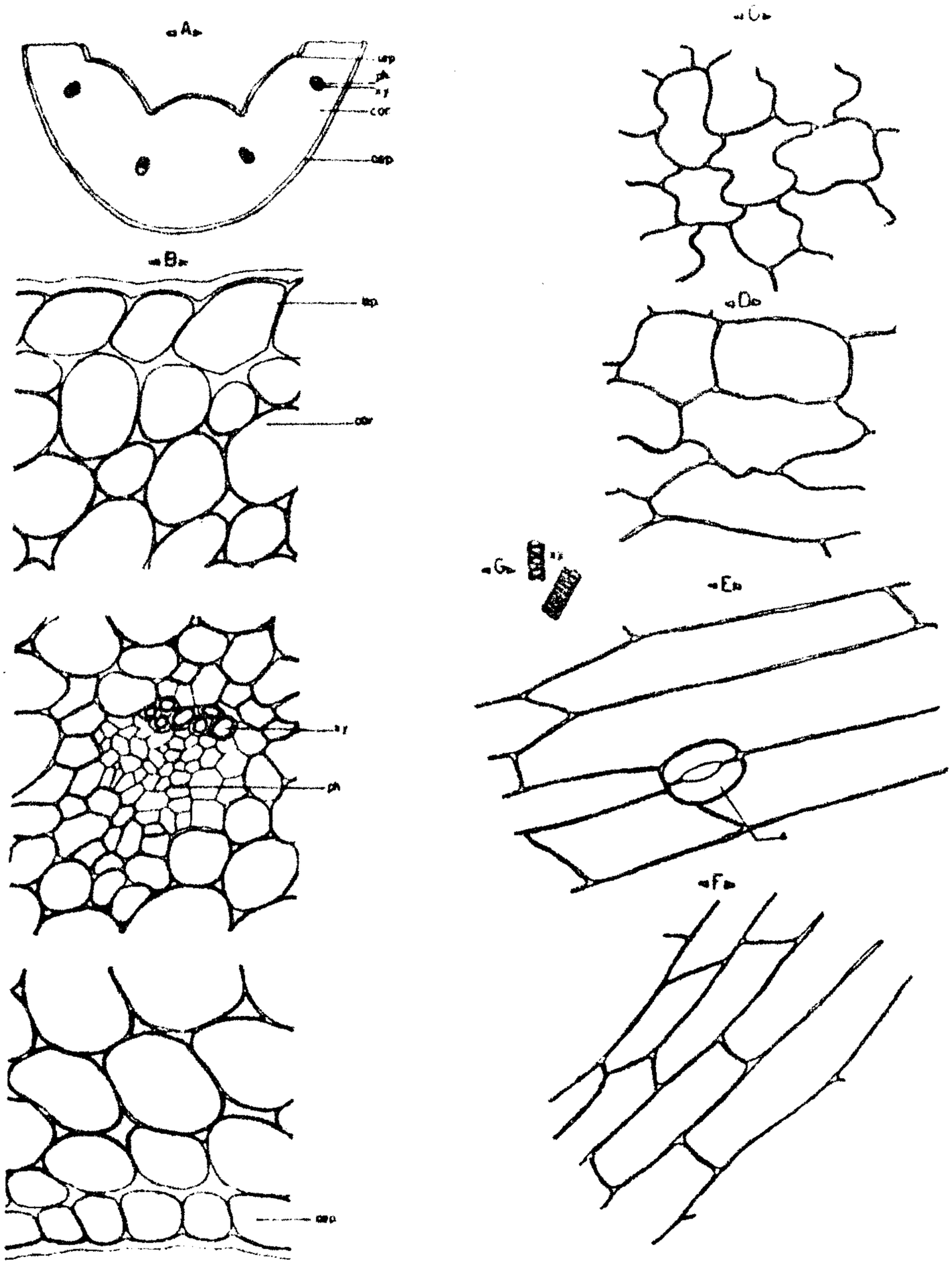


Fig. 7- The Inner Perianth

A. Diagrammatic T.S. in a segment of the inner perianth X 30
B. Detailed T.S. in a segment of the inner perianth. X 125
C. Surface view of the outer epidermis at the apical region. X 120
D. Surface view of the inner epidermis at the apical region. X 125
E. Surface view of the outer epidermis at the basal region. X 125
F. Surface view of the inner epidermis at the vasal region. X 125
G. Isolated elements.

cor., cortex; ep., inner epidermis; o.ep. outer epidermis; ph., phloem; xy., xylem.

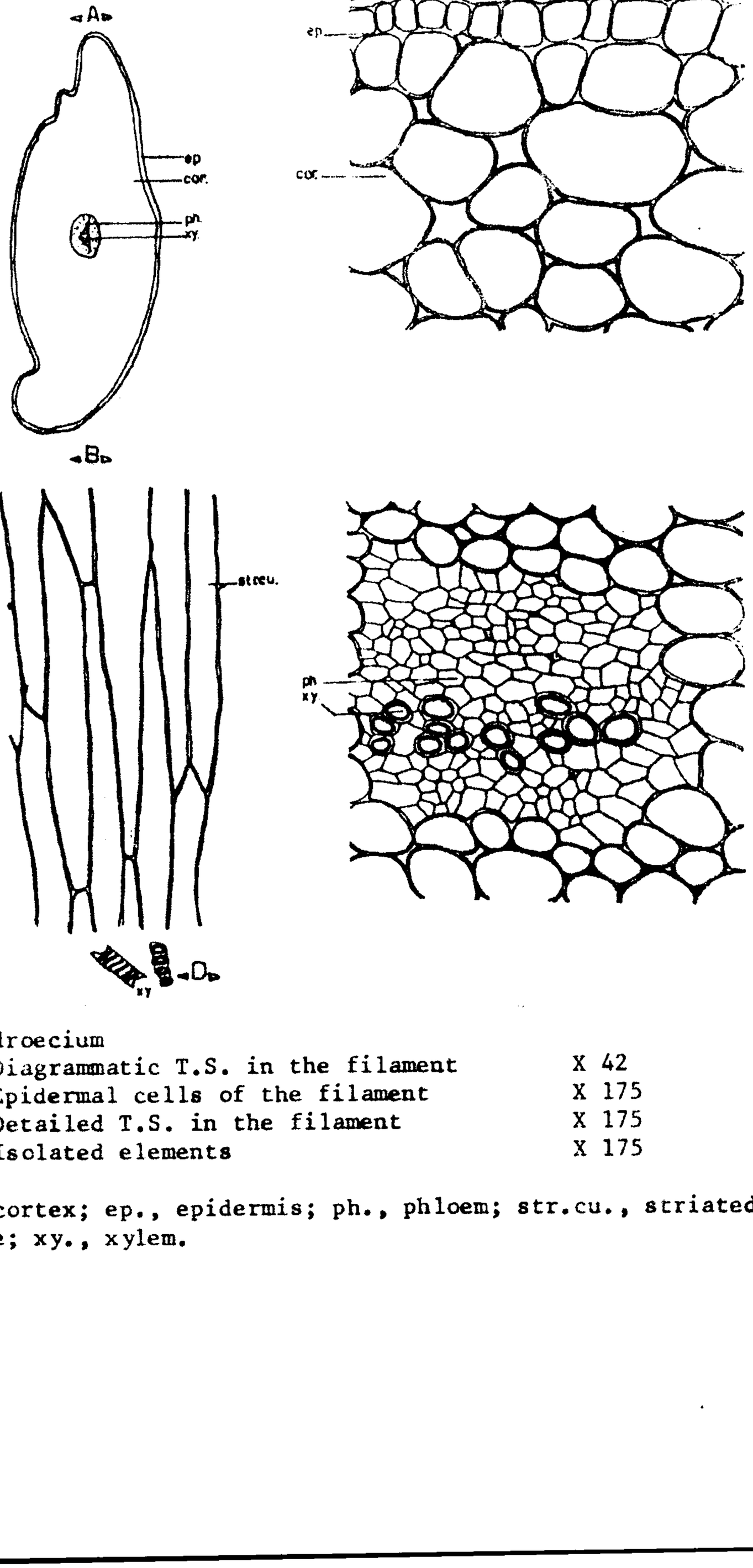


Fig. 8- The Androecium

A.	Diagrammatic T.S. in the filament	X 42
B.	Epidermal cells of the filament	X 175
C.	Detailed T.S. in the filament	X 175
D.	Isolated elements	X 175

cor., cortex; ep., epidermis; ph., phloem; str.cu., striated cuticle; xy., xylem.

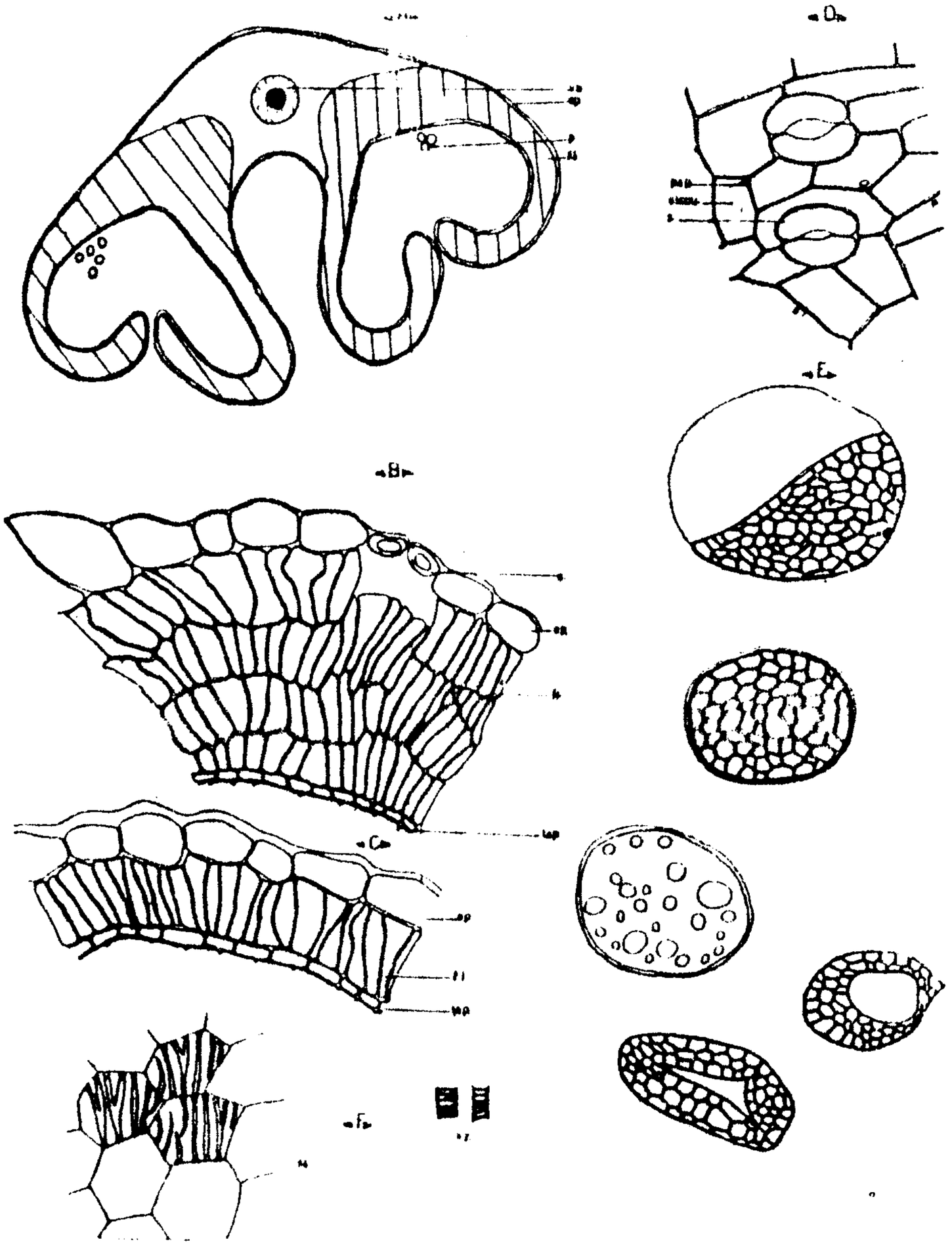


Fig. 9- The Androecium

A.	Diagrammatic T.S. in the anther	X 30
B.	& C. Detailed T.S. in the anther wall	X 125
D.	Epidermial cells of the anther	X 125
E.	Pollen grains	X 125
F.	Isolated elements	X 125

ep., epidermis; f.l., fibrous layer; p., pollen grain; pap., papillae; str.cu., striated cuticle; tap., tapitum; v.b., vascular bundle; xy., xylem.

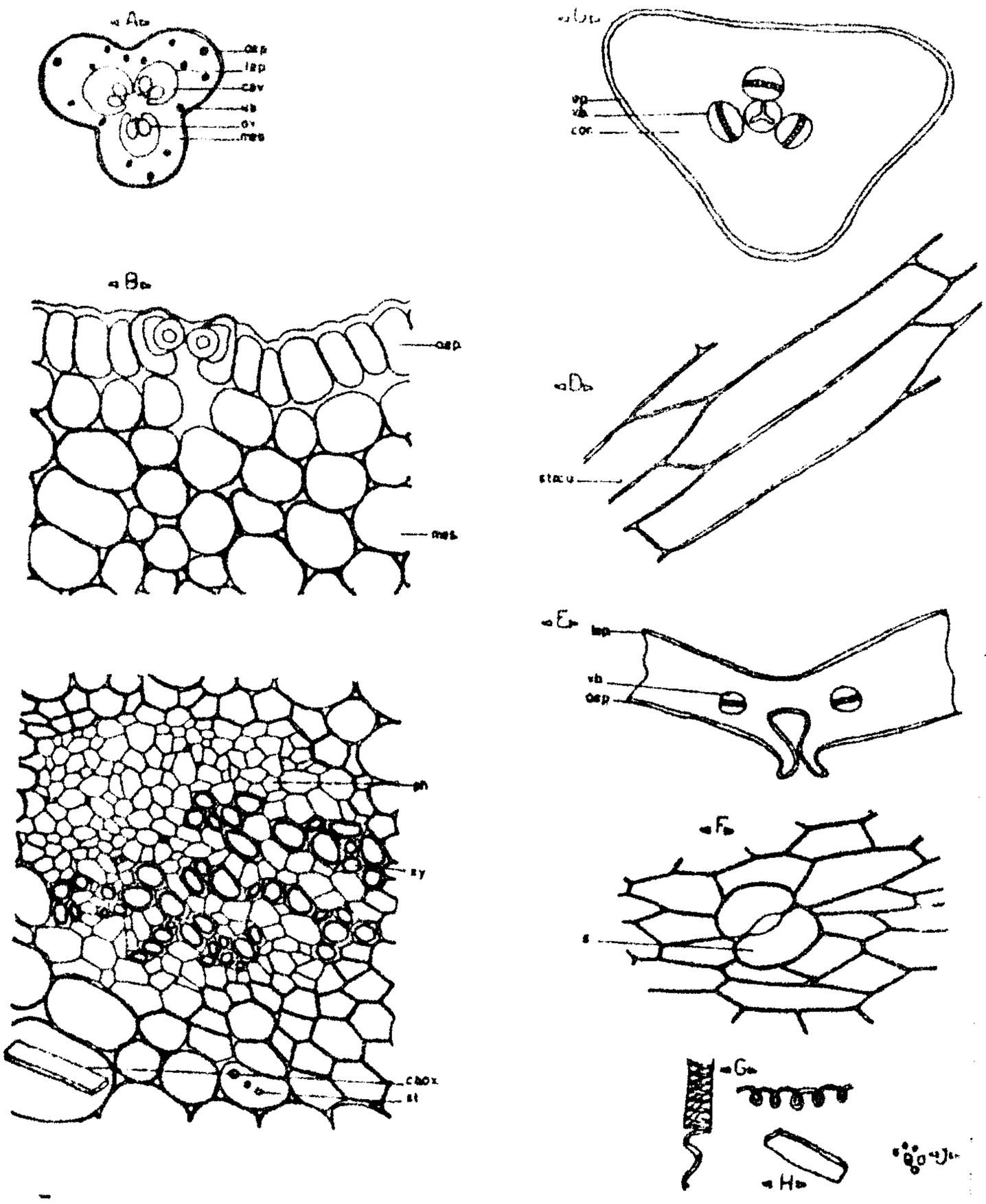


Fig. 10- The Gynaecium

A.	Diagrammatic T.S. in the ovary	X 6
B.	Detailed T.S. in the ovary	X 137
C.	Diagrammatic T.S. in the style tube	X 137
D.	Epidermal cells of the st yle tube	X 137
E.	Diagrammatic T.S. in the st yle arm.	X 137
F.	Epidermal cells of the ovary	X 137
G.	Isolated elements	X 137
H.	Styloids of calcium oxalate	X 137
J.	Starch granules	X 137

ca.ox., calcium oxalate; cav., cavity; i.ep., inner epidermis; mes., me socarp; o.ep., outer epidermis; ov., ovule; p., papillae; ph., phloem; s., stomata; st., starch granule; st.cu., striated cuticle v.b., vascular bundle; x y., xylem.

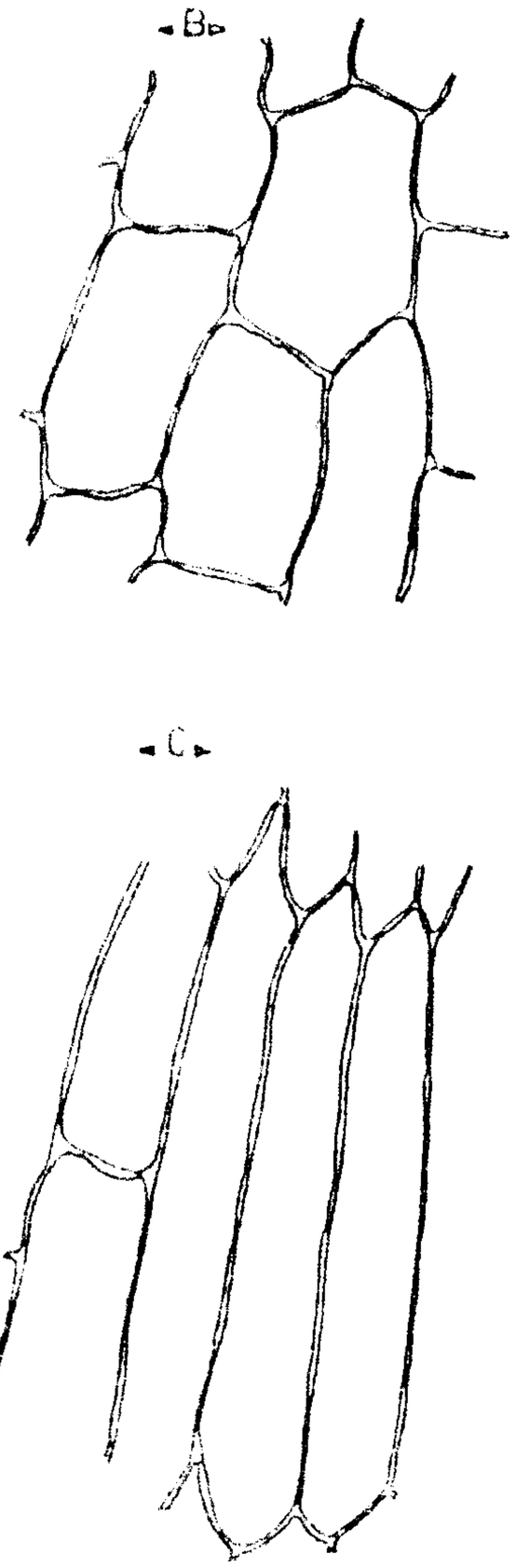


Fig. 11- The Gynaecium

A. A. Surface view of the epidermal cells of the style arm at the apical region X 175

B. Surface view of the epidermal cells of the st le arm at the middle region X 175

C. Surface view of the epidermal cells of the style arm at the basal region X 175

D. Surface view of the epidermal cells of the stigma. X 175

pap., papillae.

دراسة عقاقيرية لنبات الارس الالمانى ذو الزهرة البيضاء

الجزء الثانى : دراسة عقاقيرية للنورة

أحمد محمد المغازى ـ نصر أحمد محمد العمرى

أحمد عبد الرحمن على ـ فاتن مصطفى درويش

قسم العقاقير ـ كلية الصيدلة ـ جامعة أسيوط

تم فى هذا البحث دراسة الصفات العيانية والميكروسكوبية التى يمكن عن طريقها التعرف على نورات وأزهار النبات فى حالتها الكاملة وعلى هيئة مسحوق .

recieved in 26/1/1982 & accepted in 8/3/1982