TYPES OF PLACENTATION IN ECONOMICS PLANTS IN OUR ENVIRONMENT

(Case Study of Kuta, Shiroro Local Government Area of Niger State

BY

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A Research Project Submitted to

DEPARTMENT OF BIOLOGY

NIGER STATE COLLEGE OF EDUCATION, MINNA.

AUGUS., 2015

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A RESEARCH PROJECT SUBMITTED TO DEPARTMENT OF BIOLOGY

NIGER STATE COLLEGE OF EDUCATION

IN PARTIAL FULFILLMENT OF THE AWARD IN NIGERIAN CERTIFICATE OF EDUCATION, NIGER STATE COLLEGE OF EDUCATION, MINNA.

AUGUST, 2015

APPROVER PAGE

This research project has been read through and approved as meeting the requirement of Nigerian Certificate of Education (NCE), Niger State College of Education, Minna.

Project supervisor

06/01/2016

Date

Head of Biology Department
Niger State College of Education
Minna

Head of Department

06/01/2016

Date

DEDICATION

We dedicated this research work to Almighty God for making it possible for us throughout our academic attendance, and also to our parent for their fully support.

ACKNOWLEDGEMENT

Glory be to God that made it possible for us to finish this research successful. May his name be blessed in Jesus name (Amen).

Our next appreciation goes to our project supervisor Mr. Samuel Goshi for his assistance in making this work possible, may God bless him and reward him accordingly. I am grateful to my department lecturers and my humble head of department thanks alot.

Our profound gratitude also goes to our beloved parents, brothers, sisters and also our colleagues for their support. May God bless you all.

ABSTRACT

seed plantation in economic plant in our environments: a case study of some selected irrigation site in Kuta, Shiroro local Government Area of Niger State were studied. The purpose of the study is to provide information to student whose studies involve plant. Literature review showed that not much work has been done in this area. The study involved field work in which fruits were collected. Drawing of each frut were made.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Plants are crucial to the existence of many organisms including human being. Human have four great necessities' in life: food, clothing, shelter, and friel of the four anoadequate food supply is the most pressing need, and directly or indirectly, plant are sources of virtually all food.

Plants can be simply classified into spermatophyta (flousering or seed bearing plant) and cryptogamia (seedless plant) spermotophyta are further grouped into cymnospermae (naked- seed plants) and angiospermae (closed-seed plants)

The science that deals with study of plant is thmed bofany botany has many branches vie morphology, histology, taxonomy, physiology, ecology etc morphology deals with the study of form and features of different plants organs such as roots, stem, leans flowers, seeds and fruits. The study of external structure of such organs is known as external morphology (internal anatomy)

Uinside the ovary of seed plant are ovoiud bodies varying in number which are called ovules. Each ovule is attracted to a rigtde of soft freshy tissue (the placenta) by a short stalk known as the funide. The arrangement or attracment of the ovules to the ovules to the placetae with the ovary is kbo as placentation, or a seed

PLACENTATION: In a more specific sense since there is, also, placentation in animals. After fertilization, each ovule and each funide develops into the seed and seed stalk respective stalk respectively while the ovary as a whole develops into a fruit.

The term "economic" has to do with the material welfare of a community, ration or individual. In other words, "economic" pertains to the means of living or to the arts by which human needs and controls are supplied. Therefore, economic plant can be said to be those plant (almost all the existing plants) that provide our necessities like shelter; food and clothing some plants are medicinal for man while some are used in beautifying our environment. All these plants are referred to as economic plants.

1.3 Statement of the Problem

In Kuta Shiroro local government in Kuta Shiroro local government area of Niger state, there is a wide variety of economic plant which people of Kuta are familiar (ministry of information, communication and integration Minna).

Example amaren thus by bridus. L, tomato, okro, cabbage, pineapple, pawpaw, watermelon etc it is unfortunate that many farmer are not aware of importance of these economic plants

Many farmer under take irrigation and plant there economical plant without knowing the structure of these economic plant which will enhance propagation of these seed and plants.

1.4 Purpose of the Study

The purpose of this study is to finding out seed placentation that are found in common economic plants. There are learning aids for extension workers who educate farmers in the form of botanical drawing. Though the study, the research hope to personally improve their knowledge of plant reproductive structure and seed placetation.

The study is also intended to build teachers confidence and competence in th7e researchers. The choice of the topic is also aim at preparing the researcher for higher level in botany or biology.

Significance of the study this study is significant or important for the following reason:

Its finding can complement or dupliment the knowledge of students in plant anatomy.

The study could help reduce the knowledge or teaching defiencies of many student teachers.

Seed placentation and fruits strature are useful for botanical studies in plant taxocomy, erocution and genetic engineering and their defailed by students should be encouraged.

1.5 Scope and Limitation

Because of the limitation of time and finance, this study is limited to farm crops which are bud, flower or fruits during the three months period when irrigation is possible in Kuta. Only diagrams, rather than camera pictures of many of the plant are presented.

Some placementation are described by floral diagrams only.

1.6 Definition of Terms

Types: a class or group of people or things that share particula5r qualities or features and are part of larger group; a kind or fort.

PLACENTATION: (bot) types of arrange of placentas in a syncapous overy; a parietal carpels are fused only by heir margins, placentas, placentas them appearing an internal ridges on ovary wall. E.g vivlet; (b) axite; margins or carpels field inwards, fusing together in centre of ovary to form a single, central placenta.

ECONOMICS: the science that treats of the production and distribution of welth.

PLANTS: a living organizations belonging to the vegetables, a distinguished from the animal kingdom.

OUR: belonging or pertaining to us: the possesire case of the pronoun.

ENVIRONMENT: collective term for the condition in which an organism lives e.g temperature, high, water, other organisms.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Theoretical backgrounds the study of plant anatomy is very important subject in biology, and is important as the study of human anatomy which qualities people to become medical experts. Enough evidence gives course for belief in fact that placentation and plant anatomy (plant morphology) generally is of taxonomic value casual inspection of the surface aspects of plants however, is highly undependable for separating plant into natural groups or, for gaining a proper understanding of the nature and relationship of their parts. The science of plant morphology attempts by rigorous techniques and meticuion observations to probe beneath these surface aspects of plants. In short it tries to explore and to compare those hidden aspect of plant from, structure and reproduction which constitute the basis for interpretation of similarities among plants.

Groge (2000) in his book,: "taxonomy of vascular plants" stated that plant taxonomy as a science is treated in its or thodox sense, that is, a science based fundamentally on morphology with the support of all inter related science all taxonomis5ts are agreed that the differences between plants and the similaries that the plant may posses in common, are measureable to a large degree by the

morphological character, to a taxonomist, is one in herent in or manifested by a structural component of the plant he also said that taxomist have relied heavily on the value of characters in herent in the reproductive part of vascular plant to serve as acreteria of particular significance in their classifications. In the angiosperm reproductive characters are those of both flower and the fruiting structures professor law rance in relation of placetatuion in particular stated that taxonomically, the types of placementation provide characters of considerable significance and utility. Very often, they are employed in analytical keys especially in keys to families. It is important to be able to differentiate and recognize in different types another evidence that support the faut that placentation is of taxonomist value is from encyclopedia Britannica volume 9, where it was stated that "the placentation or arrangement of ovules within the ovary is frequently of taxonomic value!

Gobel (2001) In his monumental orgonography of plant adopted the position that "the form and function of an organ stand in the most intimate relation to each other". In similar point of view was followed by Habertiendt (2007) in his attempts to classify and to characterize the tissue systems of plants on a functional basis abundant evidence exists that the interpretation of form and structure cannot logically be divorce from function as explained by goebal and haberriandt above? This implies that there's a relationship between the structural form and the function

of many parts of plant body, in other words the above evidence shows that the study of morphological features of any part of plant body clief to determine how that part of the plate functions.

Genetic studies the variation in an individual organism is of beneficial or detrimental, and since placementation is the arrangement of seed-producing plants which results from the zygote formation after pollination in plants. It is imperature that is control led by genes. These genes that controlled by genes. These genes that control the various placementation vary from plants to lant. However, geneticists can induce certain changes in the mode of placentation by motation of gametes (male and female) so as to suilt the desire of the researcher to geneticists, such as quality fruit, seed, resistance to certain diseases etc hence gene control most placentation.

The study of placentation is also very necessary in studying megaspore genesis in plants foster and Gifford (2008) in their book titled "comparative morphology of vascular plants" staled that "before discussing megasporogenesis and the patterns of embryo-sac development, if will, therefore be essential to summarize certain of the salient topo9graphical and structural features includes placement, type of ovwe, integument amongst other.

The position of the placentation in an overy is related to the methods of union of carpels and the understanding of placentation is materially aided by examination of vascularization to the morphological thieves proposed to account for its origin, that is, origin, of carpel and their types. The most deeply entrenched and widely accepted theory for the origin of carpel according to g. it 19 Lawrence is the condollen or appendicular teory it was first propored by cluethe (2009) Amplified by van Teghen (2010) And more recently defended on the basis of detailed anatomical shelied by Enmes (2009), Arber (2010) And others the fundamentals of this theory and that the contecedent of the carpel (and of no living example exist) has a non-photo synthetic folian appendage, probably alive palmetely 3 – vained dorsiventral structure supplied with 3 vascular stand of basces functionally. It is believed to have been originally an open flat megas porphy bearing ovales on its margins, and to have folded length wise with ovcules inside and margins fused. The carpel is the basis foliar unit of the female reproduictive origin of the angiosperm flower.

Dutta (2008) Detined carpel as a metamorphosed leaf. The foliar nature of the carpel may be made out from the flower of pea, bean, gram, etc where a single carple is present. In such cases the carpel of the pad many be compared to a leaf which has been folded a long its midrin. In a folded carpel when the two margins meet and fused together a chamber is formed , the junction of the fused margins of

the carpel being known as the rentral sature, and the midrib along which the carpel is folded being known as the dorsal sutrure. A long ventral sature a ridge tissue, called the placenta, develops and bears the ovules the closed chamber formed by the folding of the carpel, enclosing the ovules, is overy. In apocarpous pistil as in butterup, the syncarpons pishil, however, the carpel may be united by their margins only, forming an one charbered ovary as in orchids, pawpaw, etc. or the carpel may be folded inwards, their margins meeting in the centre, thus resulting in in a few axis as in lily, chinarose etc.

Dutta ent on to explain type placentation in angiosperms. The placenta is a ri,dge of tissues parenchymatous out growth in the manner wall of the ovary to which the ovule or vules remain attached. The placentae must frequently develop on the margin of carpels, either a long their while line of union, called the suture, or at their base or a pex. The manner in which theplacentae are distributed in the cavity of the ovary is known as placentation. As a rule the origin of an ovule or group of ovules determines the position of the placentae.

Types of plancetation: in the simple ovary (of one carpel) there is one common type of placentation, known as marginal, and in the comnpound ovary (of two or more carpel united together) placentation may be axile, oparietal, central, free central, basal or superficial.

1. **Maricinal:** in marginal placentation the ovary is one-chambered and the placenta develop, along the junction of the two margins of the carpel, called the ventral suture, asin lengumi nosae (e.g gram, pea, bean, hold molur, cassia, mimosa, etc). the line, or suture, corresponding to the midrib of the earpel is known as the dissal suture. No placenta develops here.
2. **Axile:** in axile placentation the ovary is two chambered – usually as many as the number of carpel and the placentae bearing the oraries develop from the central axos xors corresponding to the conflyent margins of carpel,and hence the name axile (lying in the axis), as in lemon, orange, chinarose, lany's finger, tomatos, patato etc.
3. **Parietal (partietis, wall):** In parietal placentation the ovary is one chambered, and the placentaec bearing the ovules, develop on the inner wall of the ovary their position correspond to the conflueits margins of the larpels and their number corresponds to the number of carpel as in pawpaw (carica) poppy (paparer), pricly poppy (arge mone), radish etc, the placentation is also atta agh the overy is two chambered. In them the ovary is at first unilocular but soon afalse partition wall develops across the ovary dividing it in two chambers, while the seed remain attached to a wiry frame work called the septurn.

4. **Central:** in central placentation, the septa or partition walls in the young ovary soon breakdown so that the ovary becomes one chambered and the placentae bearing the ovalry develop from the central axis as in (aryophyllaccae,) e.g pink (dianthas) pchycarpon, soap wart (seponaris), etc. remnant of partition wall may often be seen in the nature ovary.
5. **Free central:** in free central placentation the placenta arises fron the base of the ovary projects far into cavity as a swollen central axis and bears the ovules all over its surface since placenta lies free in the single chamber of the ovary, the placentation is said to be free central. This is seen in primrose (primala).
6. **Basal:** In basal placentation the ovary is uniloceilar and the placenta develops directly on the thalamus, and bears a single ovule at the base of the ovary, as in compositae, e.g sunflower, marigold, losmos etc.
7. **Superficial:** In superficial placentation the ovary is multilocular, carpels being numerous, as in axile placentation, but the placentae in this case develops all around the inner surface of the partition walls, as in waterlily (Nyonphaea).

2.2 Empirical Background

Research studies on the topic of the present project has been rare to come by however, similar studies on the other topics in Botany have been recorded by different researches.

Omotoye ola rode (2010), In his study comparative morphology of inflorescence in inest African moracaea. In journal of the science teacher association of Nigeria vo. 25, 2012) stated that synthetic inter pertations of morpppholooogy and or anatomical fea of related taxa provide opportunities for re-appraisal of taxonomical relationship or affiliations, for under standing, the source of taxonomic difficulties or for reinforcing the basis of established taxonomic alignments.

Louis Nyananyo (2011) (in Biologia Africana) Stated that morphological types of stomata are used as reliable taxonomical characters.

Nilson (2012) Found pollen morphology a valuable tools in the taxonomy of the portulacecaeae when he studied pollen morphology in talineae (port) senses MCNEILL, 2012.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The procedure of this study basically includes:

1. The collection of angio spermons fruit from various site within and around Kuta Local Government.
2. Making longitudinal and transverse section of the collected fruits.
3. Identifying the type of placentation of each fruit.
4. Making a simple labeled diagrams of each section made from the fruits.

3.2 Material Used

i. Sharp knife (for plucking and cutting fruits).
ii. Polythene bags
iii. Date note book
iv. Tags for numbering the specimens
v. Drawing sheets for papers
vi. Ruler (for measuring the size of the specimens)
vii. H.B pencil, eraser, and pen
viii. Hand lens
ix. Buds, fresh and dry matured fruit of some angiosperms.

3.3 Method of fruit collection

Some fruit of common angiosperms species were collected from various site of Kut Local Government Area. The specimen were carried to the federal science and technical college biology laboratory in polythene bags some vitu knife

(scapel) which was used in plicking fruits (some fruit were plucked with hand) the date note book and open were used in recording the location habitat (forest edge field etc) collection number date of collection name of economic plants used and the collects name. only average and are not over luxuriant specimen were used this was to show as many types of placentation as possible from these fruits of economic plant.

3.4 Plant Description

Important botamical and morphological date about each specimen were collected and recorded. All specimen from the field were numbered this was done by attaching a tag on each fruits collected. The number on the tag correspond to the one in the field note book. All information pertaining to the plant from which the fruit were collected were recorded against the number. The kind of information noted down in the data were scientific name (i.e genus and species) with English or common name of known in parenthesis following the scientific name.

3.4 Fruit Section and Drawing

In the laboratory, after identifying the fruit specimen (i.e their name and families) the fruit were cut. One after the other into sections – longitudinal and transfers is most cases. Then the type of placentation of each fruit was carefully identified using standard biological texts.

Diagrams were them made of each section cut from the fruit. Magnifying glass (handling) were used where necessary.

The diagrams were labeled. The scientific and common name of each plant were written below each drawing. The type of placement in each was written by the diagrams of the fruit. The magnification of each drawing was written near the drawing.

CHAPTER FOUR

BOTANICAL DRAWINGS

This section includes drawings of different types of seed placentation found in the study.

FIGURE	NAME OF PLANT
1	Abelmoschus escutentum (okro)
2	Theretia peruviania (milk bush)
3	Cavavine equisetifolia (whistring prine)
4	Terminalia catapa (country almand)
5	Lycoperiscum esculentum (tomato)
6	Capsicum annum (peper)
7	Cucumis sativas (cucumber)
8	Psidium gnajava (gnara)
9	Solanum melogena (garden egg)
10	Vigna Sinensis (bean)
11	Irvingia gabonensis (ogbono)
12	Carical papaya (pawpaw)
13	Ileobroma cacao (cocoa)
14	Cucurbita papo (pumpluin)

15 Citrus sinessis (orgnge)

16 Cocos nucifera (coconut)

17 Musa sa pientum (plantain)

18 Mangifera indica (mango)

19 Malus sylvestus (apple)

20 Elacis gaineansis (palm nut)

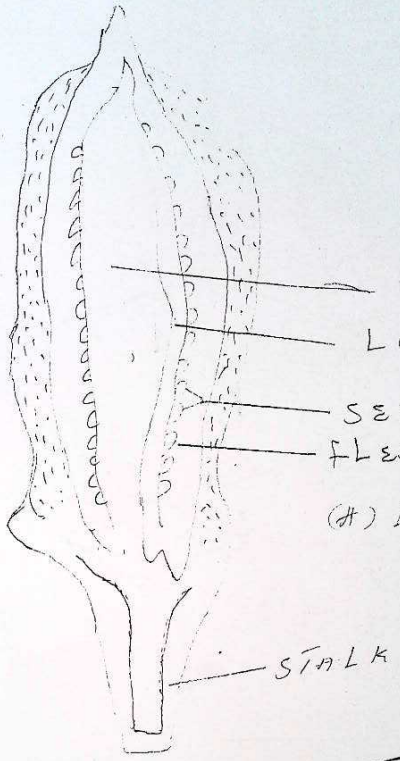
21 Brassica campestris (mustard)

22 Cytrullus vuigaris (water melon)

23 Arachis hypogeca (ground nut)

24 Nymphea lotus (water lilly)

25 Delonis regia (flamboyant)



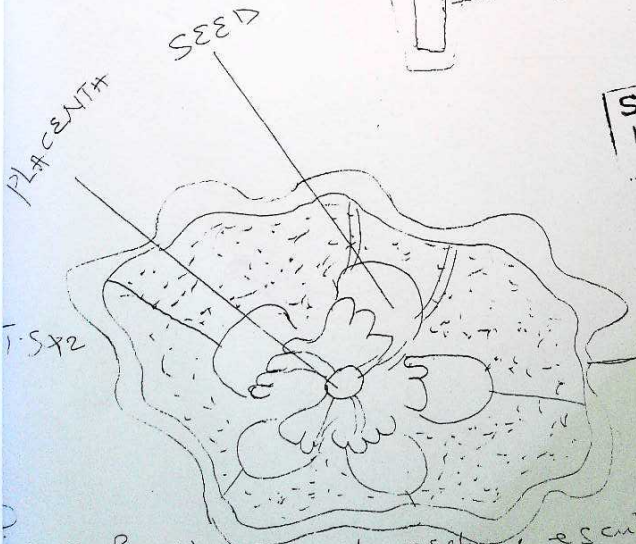
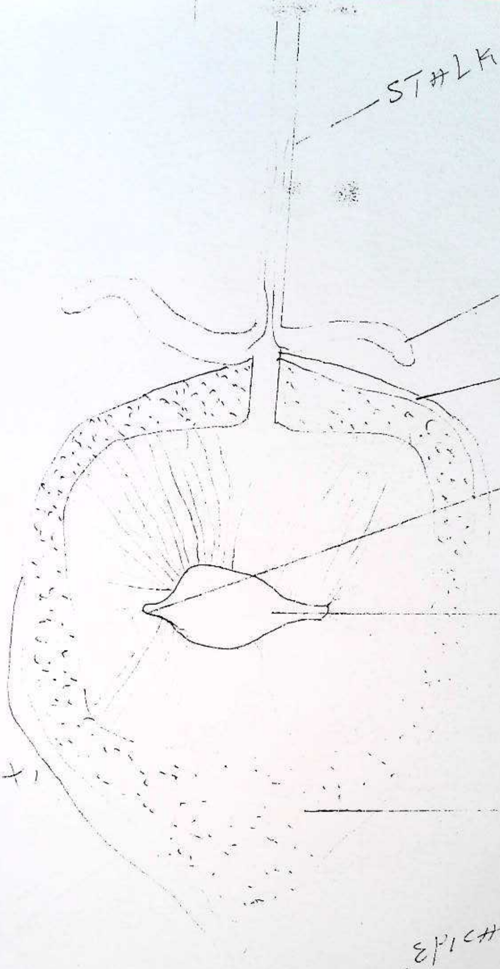
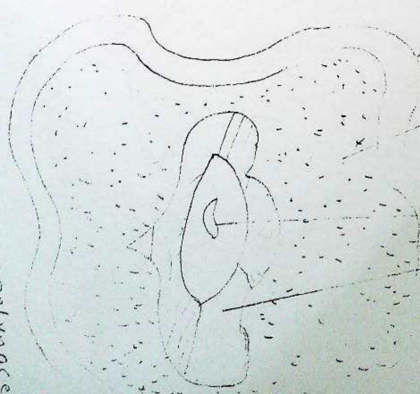


Fig. 2 fruit of Abelmoschus esculentus (OKRO)
family = malvaceae



(A) L.S.

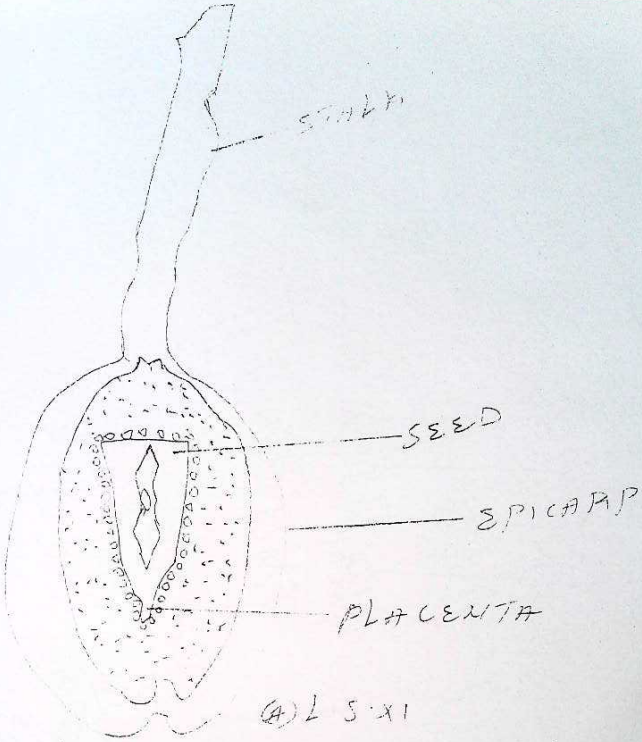


(B) T.S.

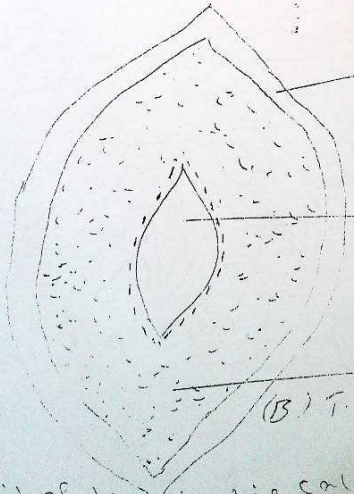
fig.2. fruit of the thevetia peruviana (milkbu

family Apocynace

placenta parietal

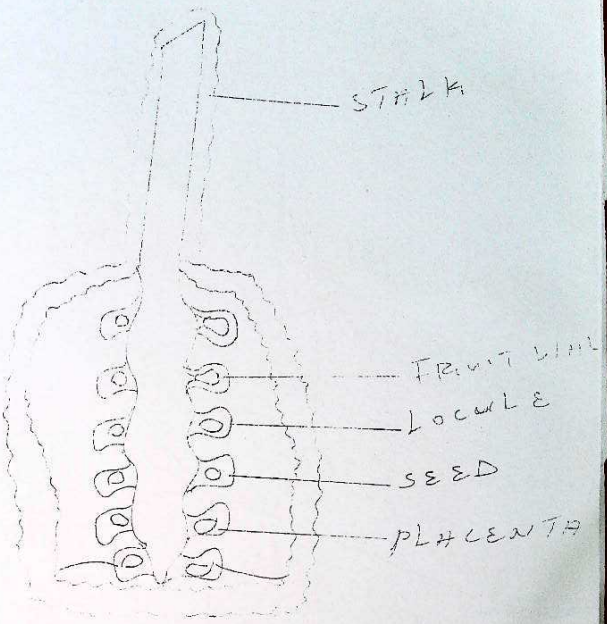


(A) L.S. X1

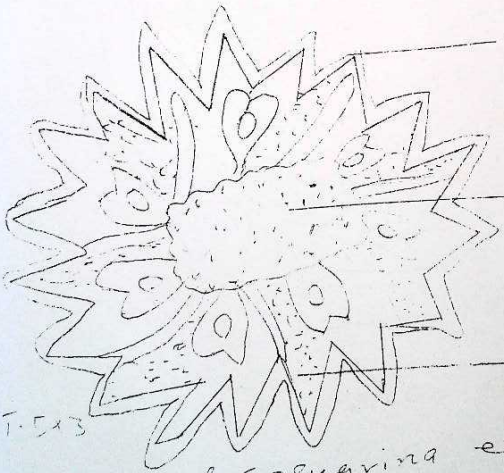


(B) T.S. X1

3. fruit of terminalia catappa (country lomond)
family: combretaceae

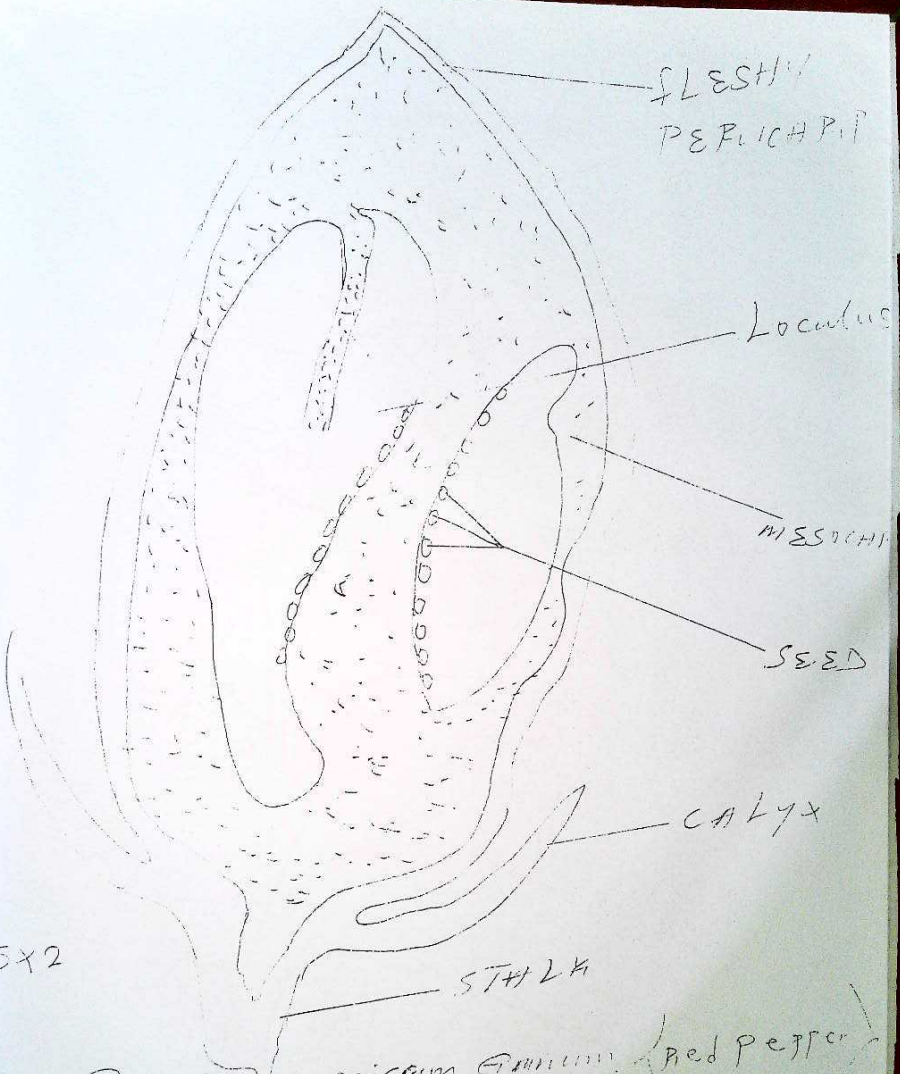


(A) L.S of



(B) T.S of

Fig. 4. fruit of Casuarina equisetifolia (whistling pine)
family: casuaricae
placentation: axile

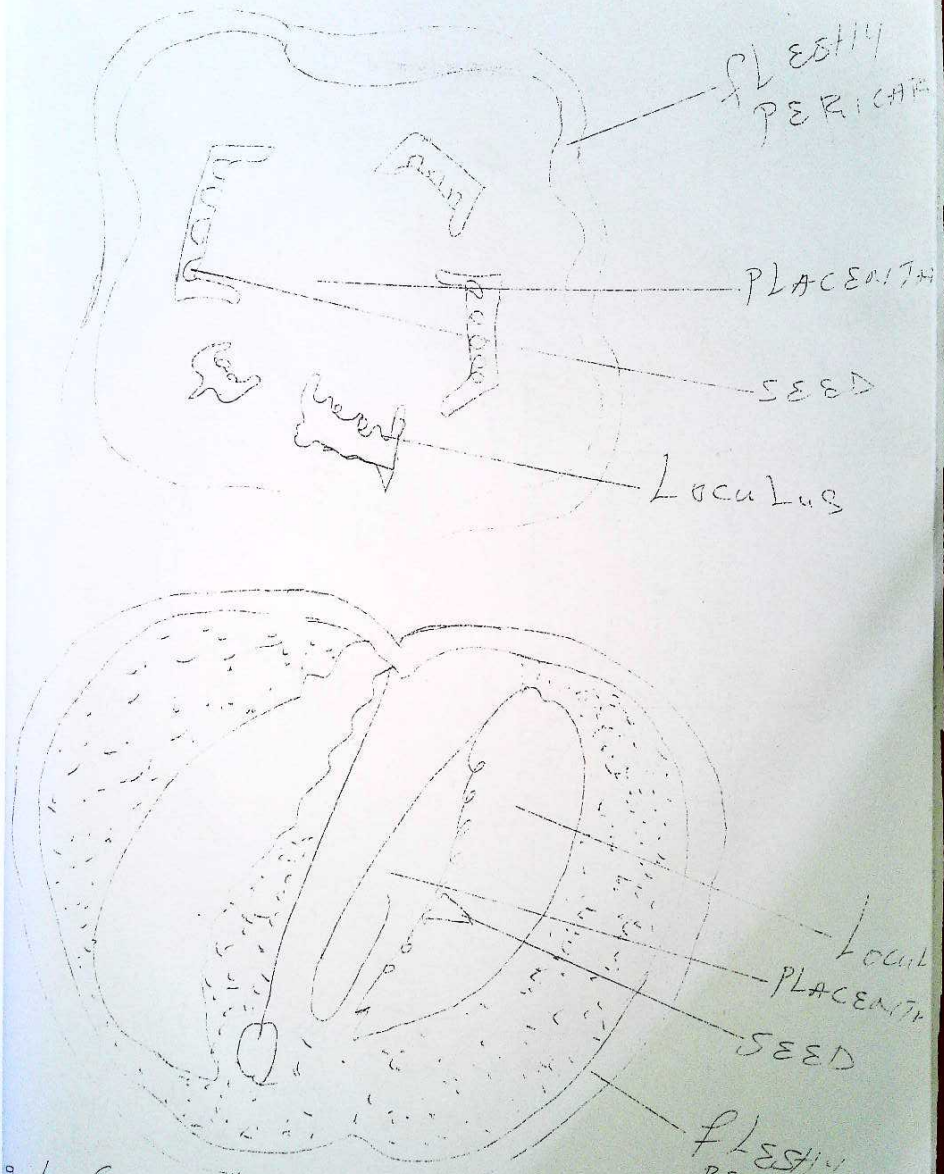


5x2

Fig. 5: Fruit of Capsicum annuum (Red pepper)

Family: Solanaceae

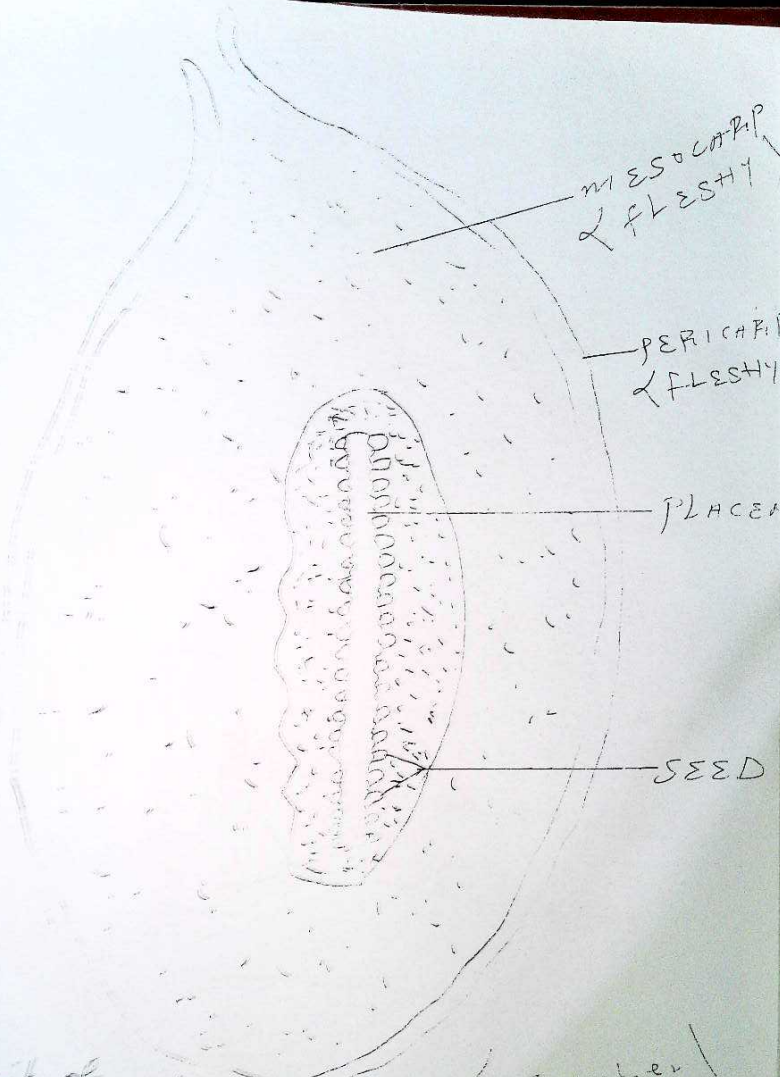
PLACENTATION: Axile



9.6. fruit of lycopersicum esculentum (Tomato)

family: solanaceae

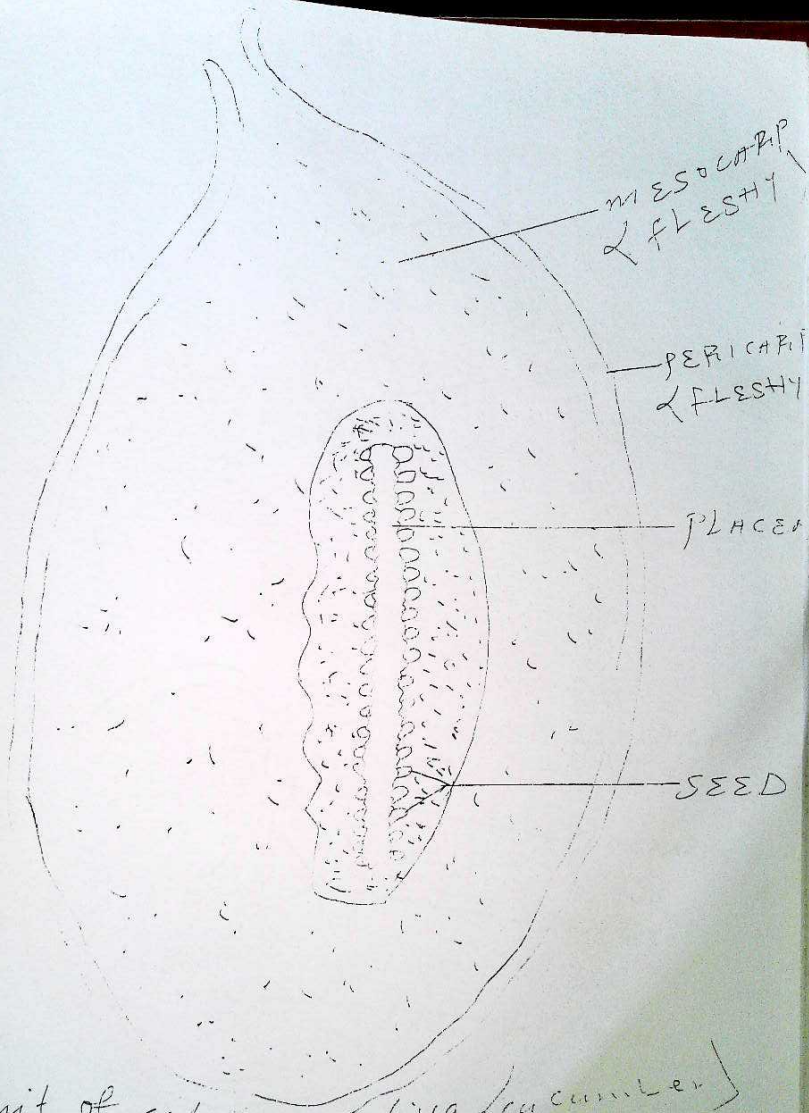
PLACENTATION: Axile



2. Fruit of Cucumis sativa (cucumber)

Family: cucurbitaceae

PLACENTATION: parietal

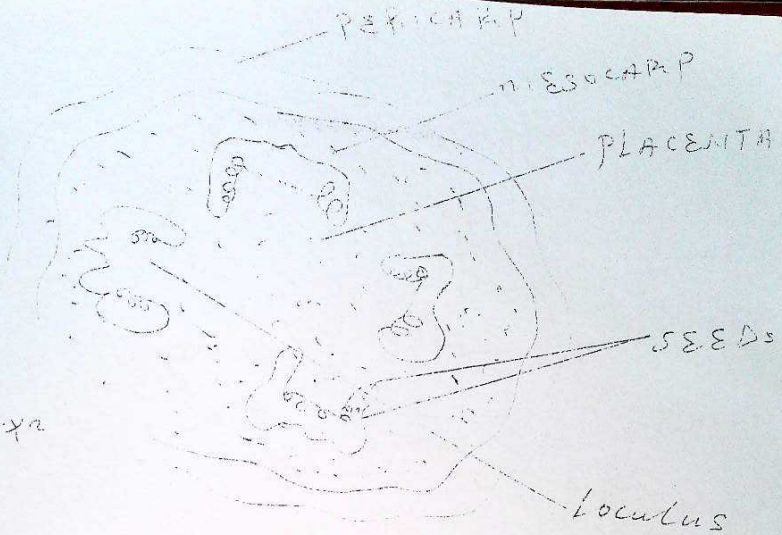


.5 x 1

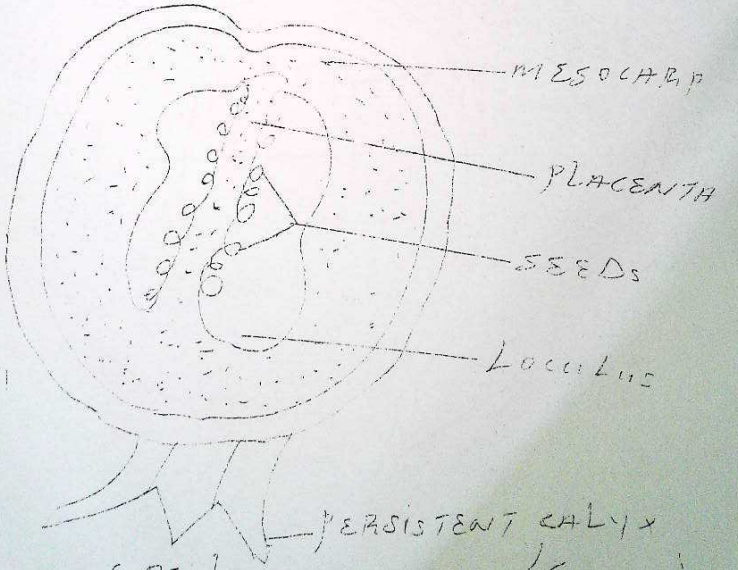
Fig. 7. Fruit of cucumis sativa (cucumber)

Family: cucurbitaceae

PLACENTATION: parietal



A) T.S. of



B) L.S. of

Fig 8. Fruit of Psidium guajava (Guava)

Family : myrtaceae

PLACENTATION : AXILE

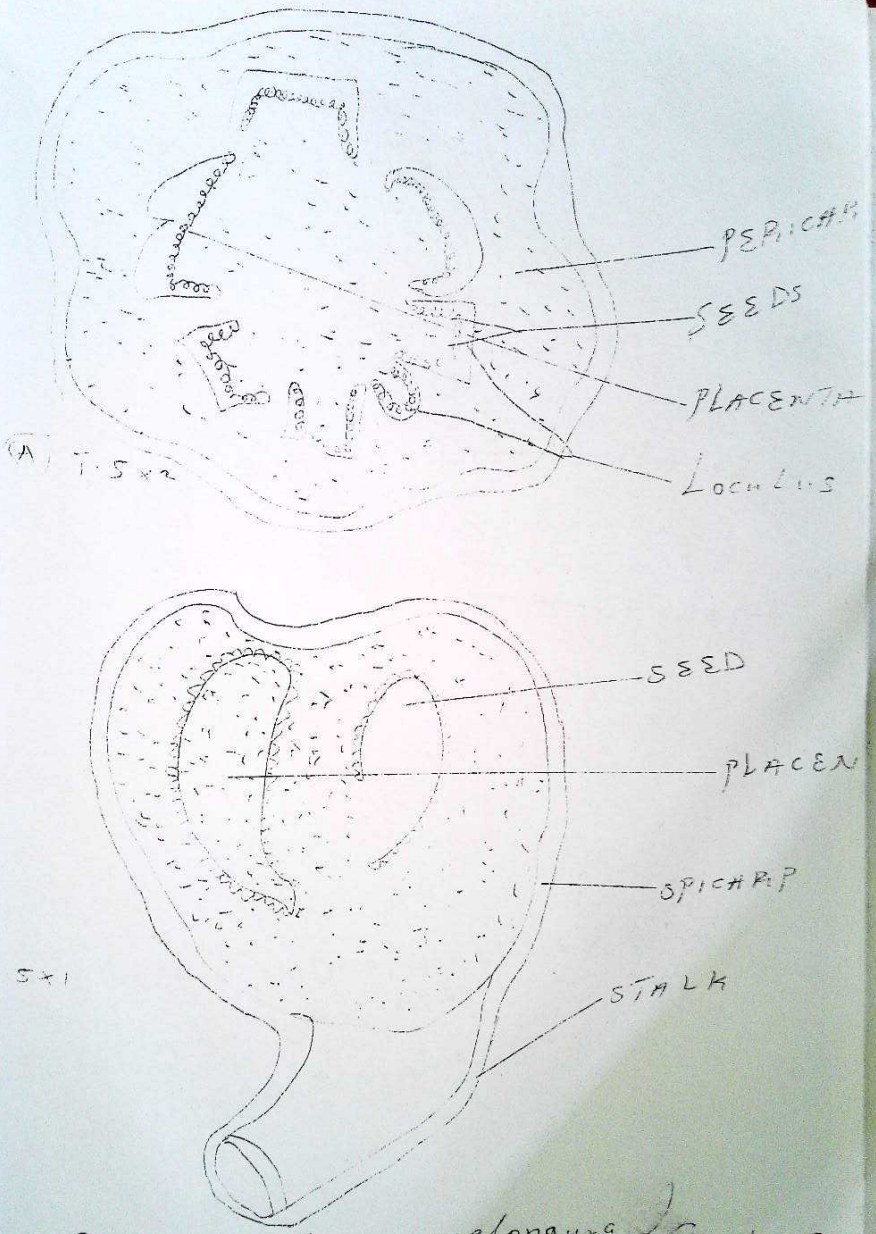
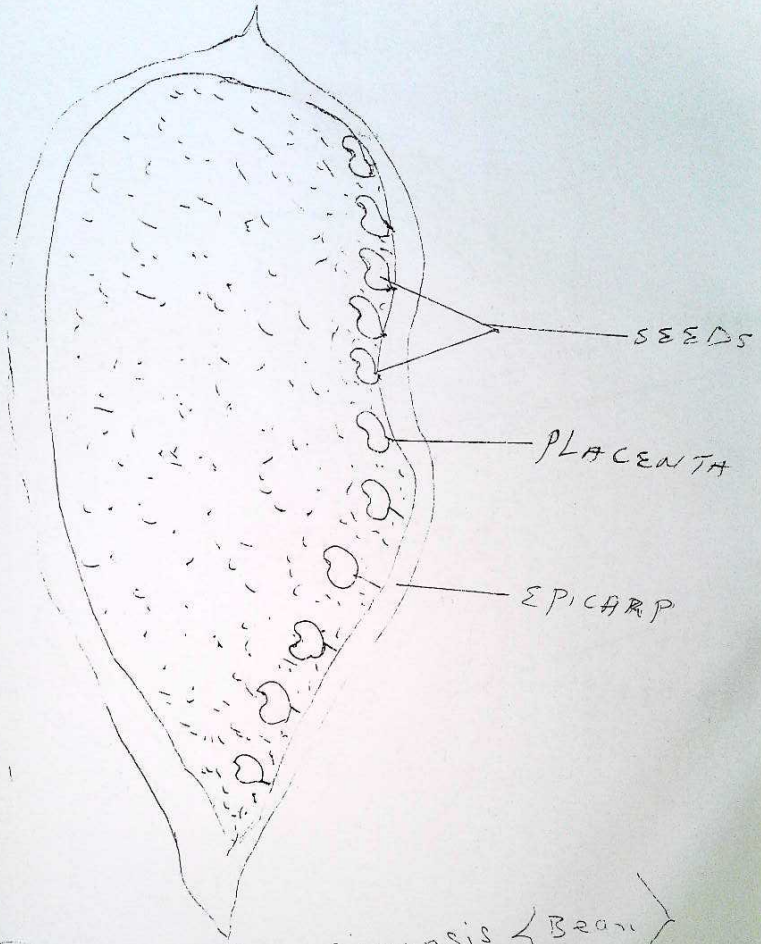


Fig 10. fruit of Solanum melongena / Garden egg

Family- Solanaceae

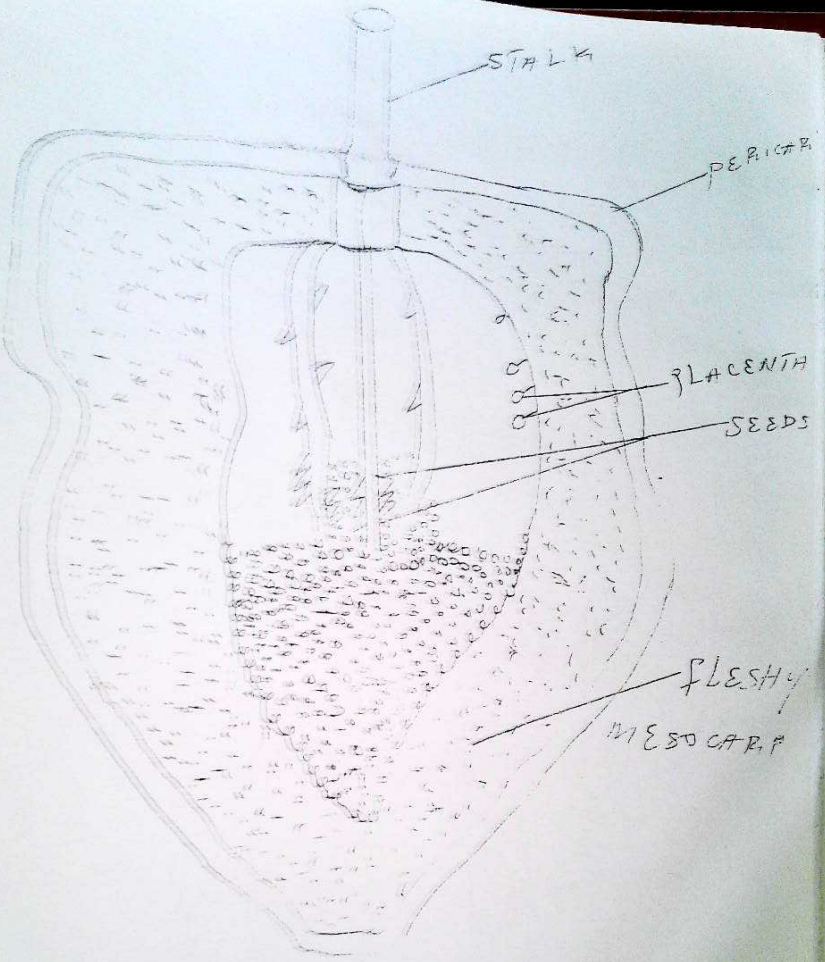


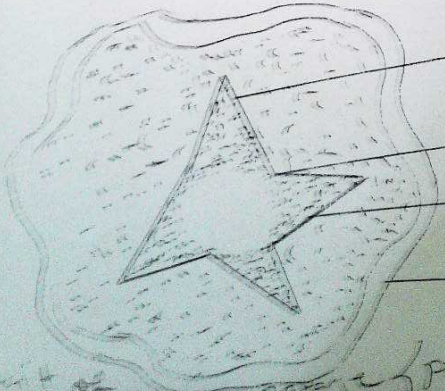
L. S x 1

Fig 11. Fruit of Vigna sinensis (Bean)

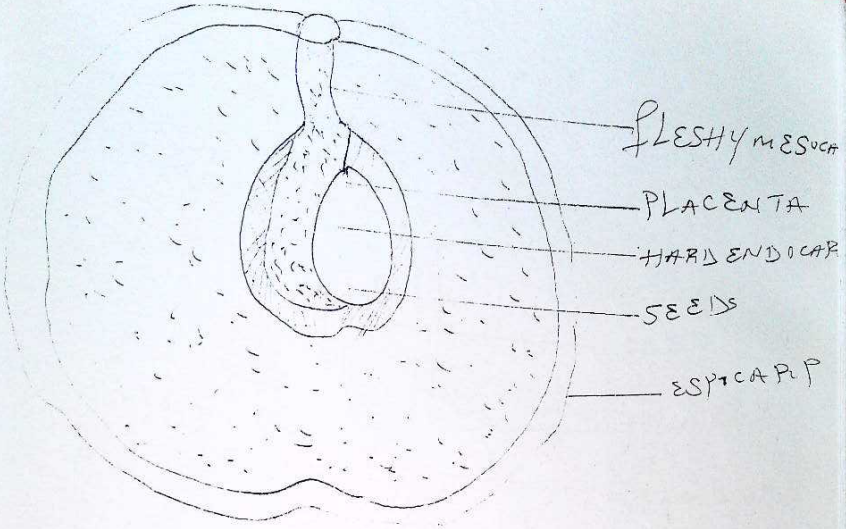
Family = Leguminosae

PLACENTATION = marginal


STALK
PERICARP
PLACENTA
SEEDS
FLESHY
MESOCARP


LOCULUS
FLESHY MESOCARP
SEED
EPICARP

(paw - paw)



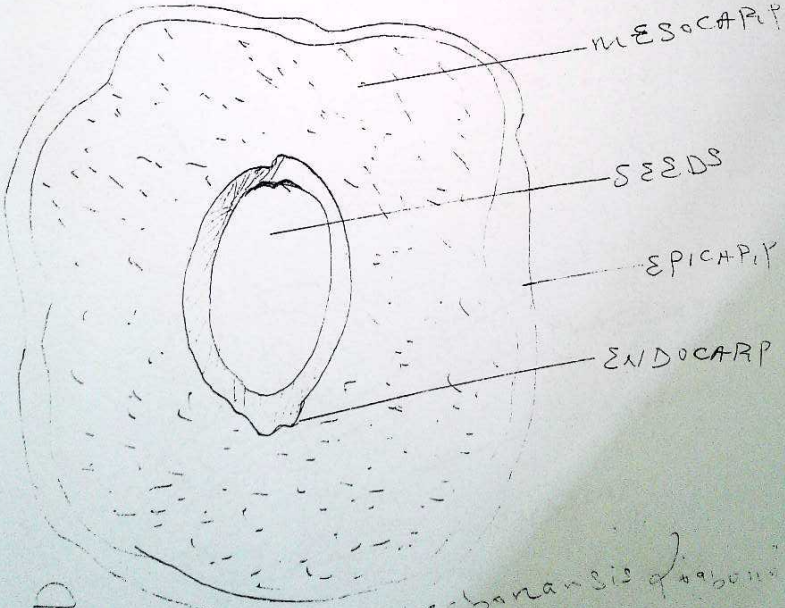
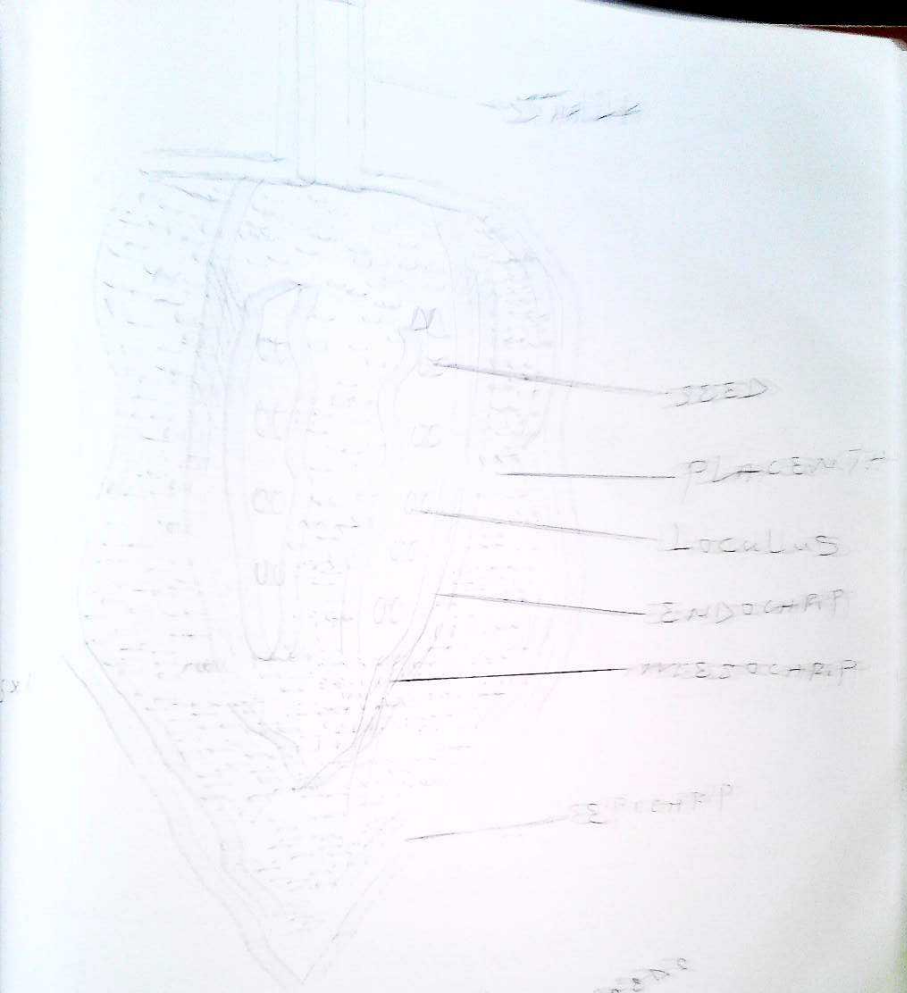
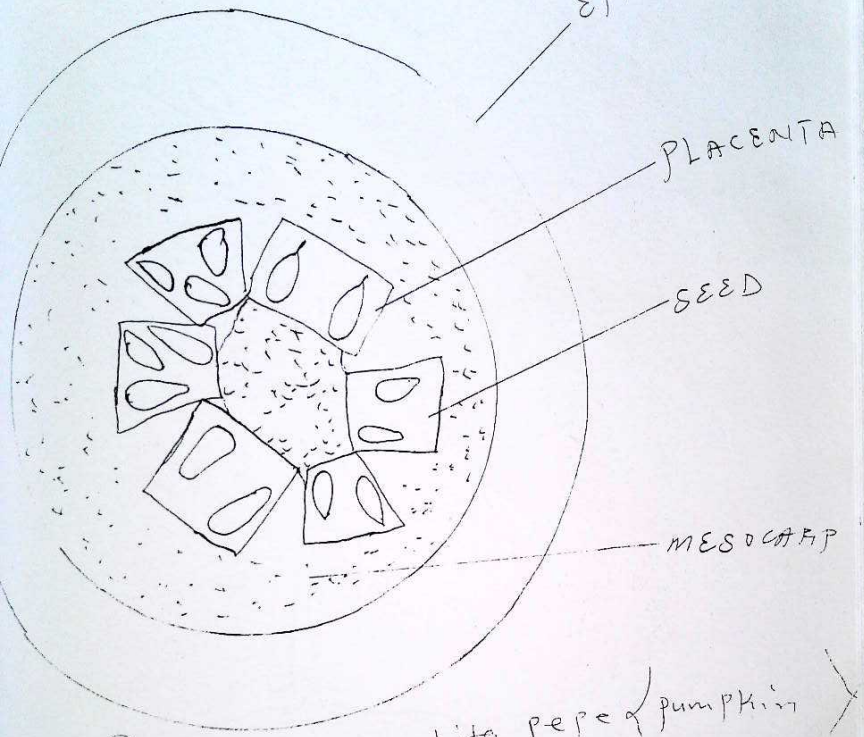


Fig 11: Fruit of Irvingia gabonensis (Irvingiaceae)


SEED
PLACENTA
LOCULUS
ENDOCARP
MESOCARP
EPICARP


SEED
PLACENTA
MESOCARP
ENDOCARP
COCOA (Cocoa)

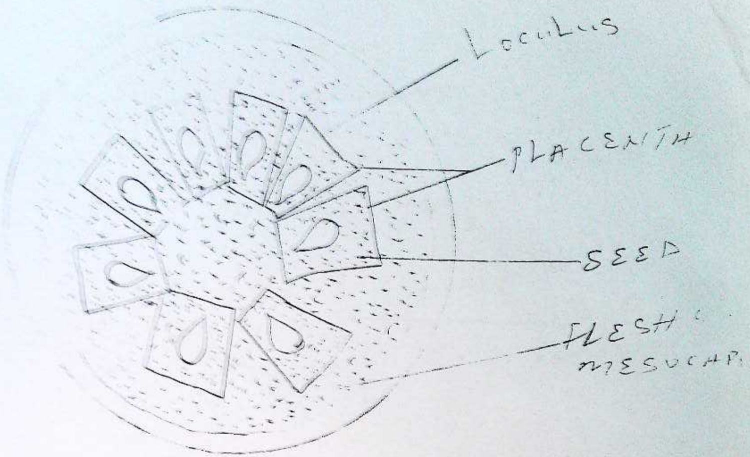


14 Fruit of Cucurbita pepo (pumpkin)

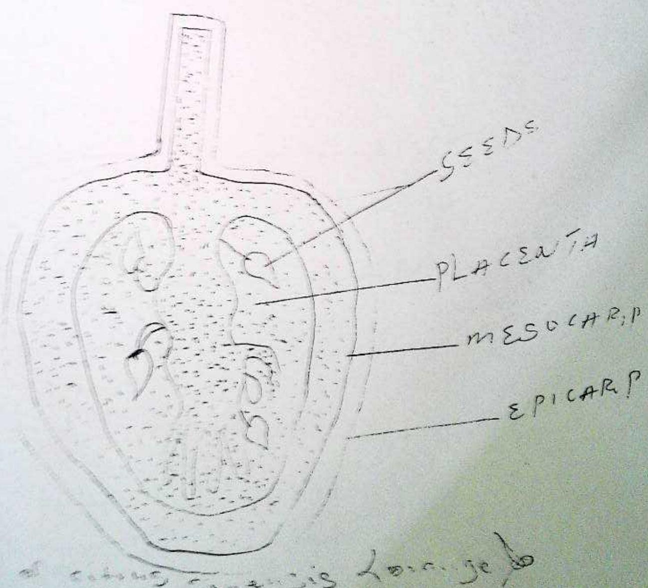
family = cucurbitaceae

PLACENTATION = parietal

TS ×1



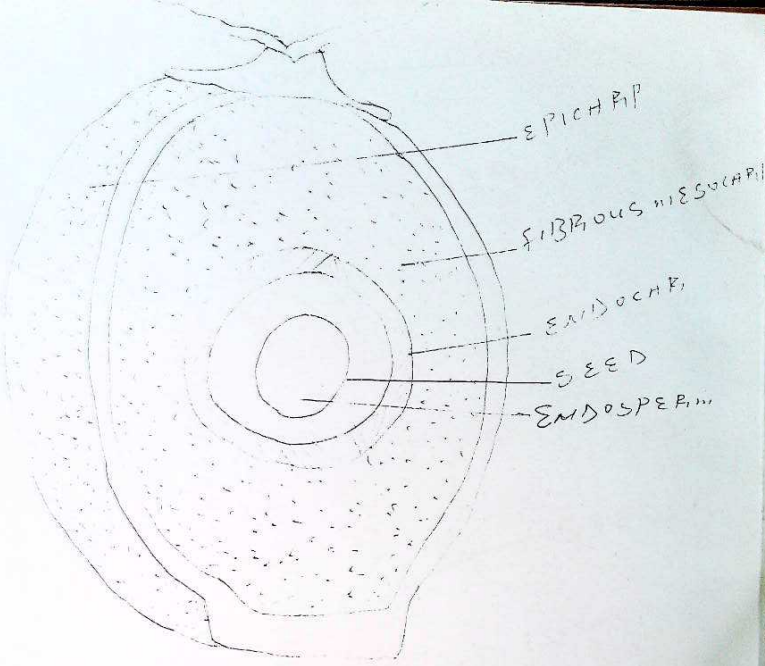
B LS ×½



3.15: Fruit of citrus sinensis (orange)

Family: Rutaceae

Placentation: Axile



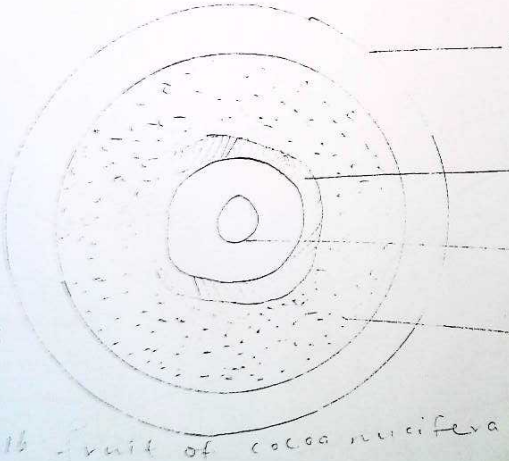
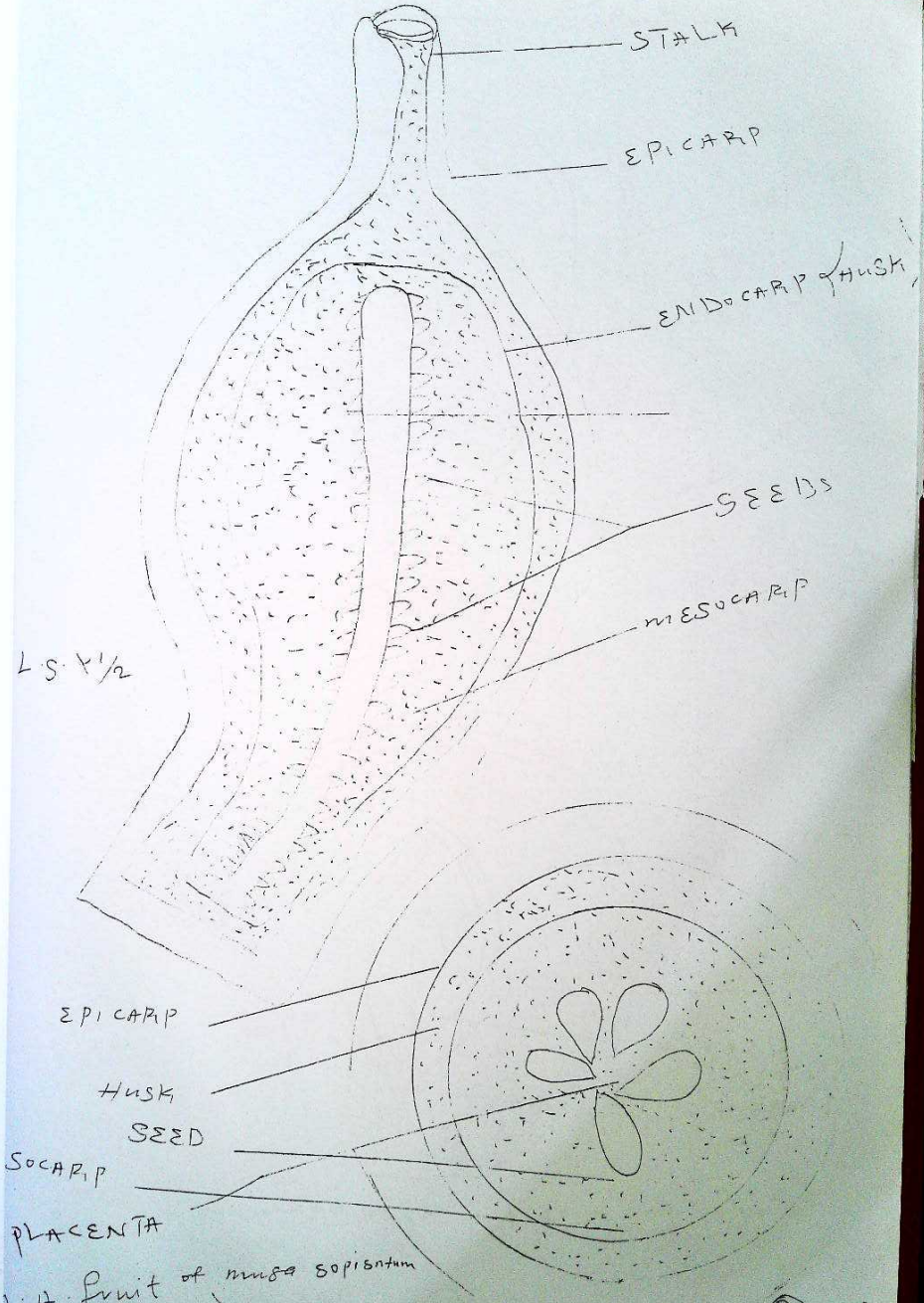


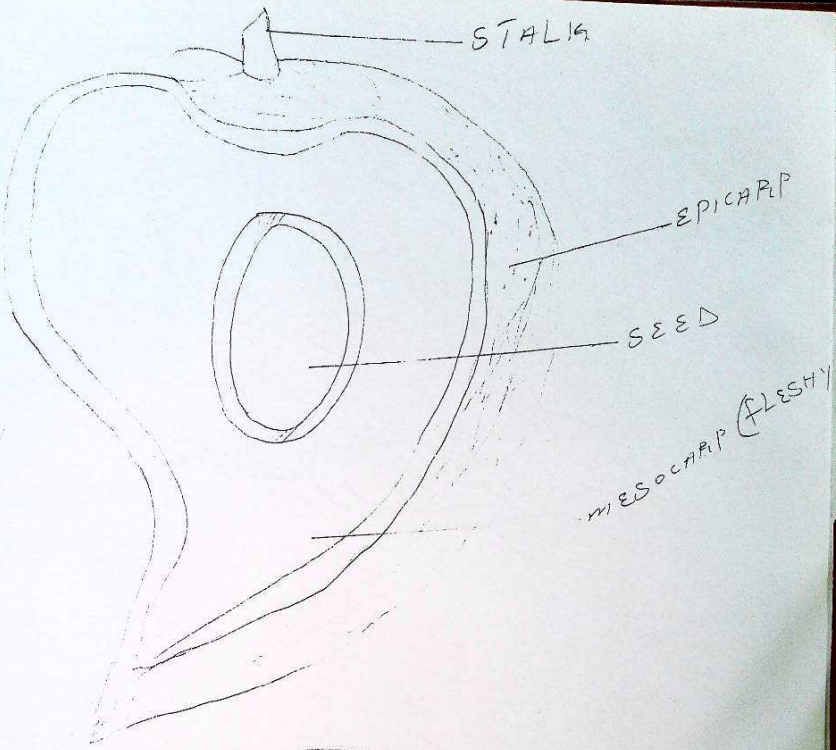
Fig 16 - Fruit of cocos nucifera (coconut)

Family: palmae

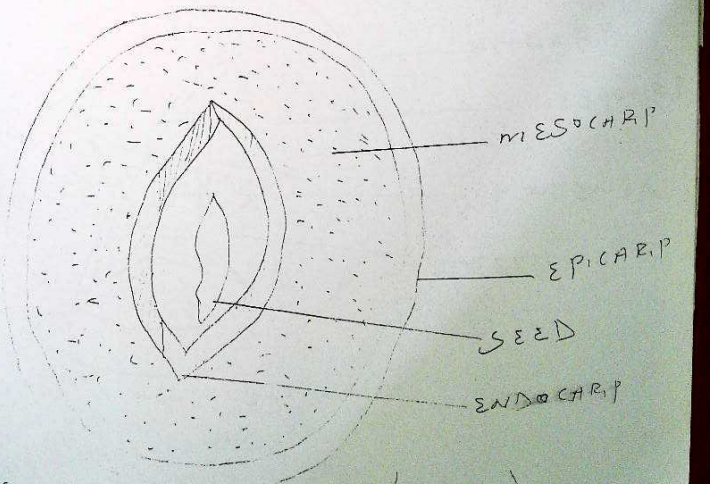
PLACENTATION: Basal



17. fruit of musa sapientum
plantain
family = musaceae
= PLACENTATION = axile



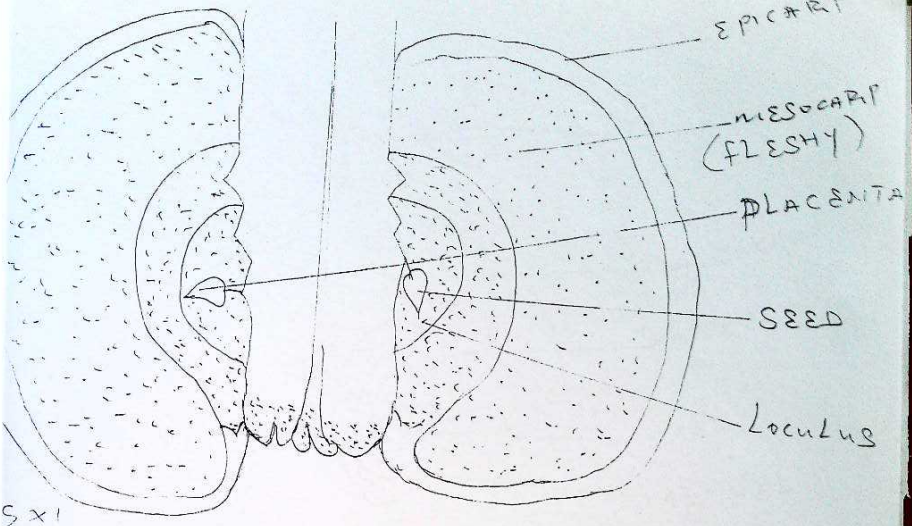
T.S. X1



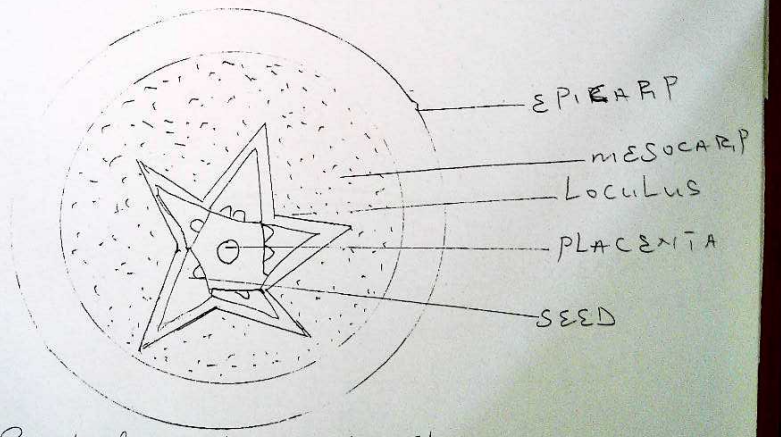
18 Fruit of mangifera indica (mango)

Family = Anacardiaceae

PLACENTATION = Basal



S x 1



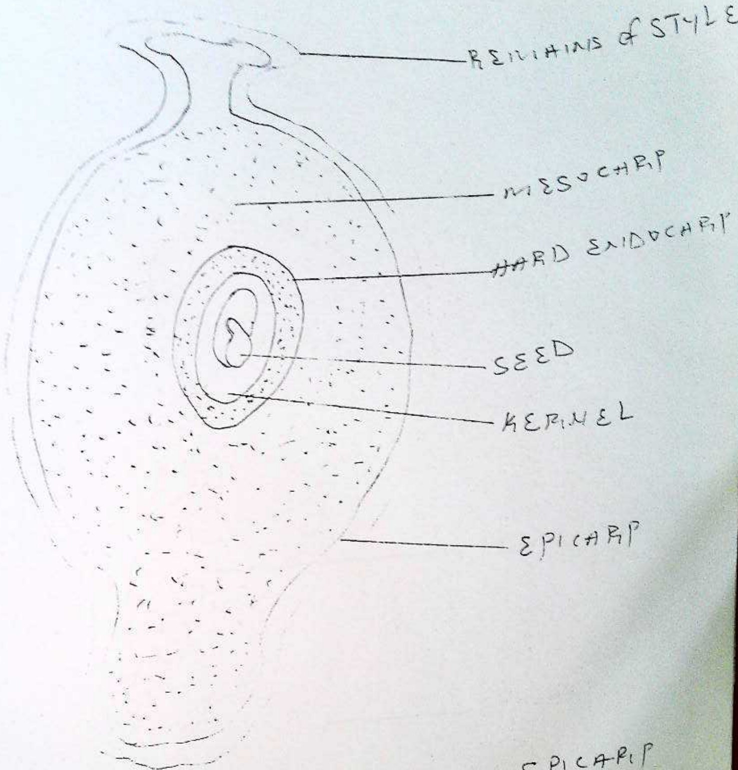
T.S x 1

Fig 19. Fruit of malus sylvestris

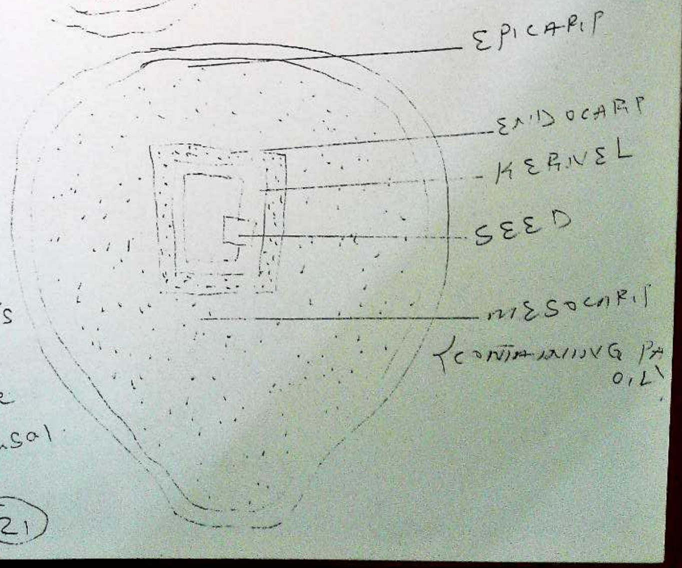
family = myrtaceae

PLACENTATION = Axile

L.S x3



T.S x3



20. Fruit of elaeis guineesis
dilpala
miLy = plamae
PLACENTATION = Basal

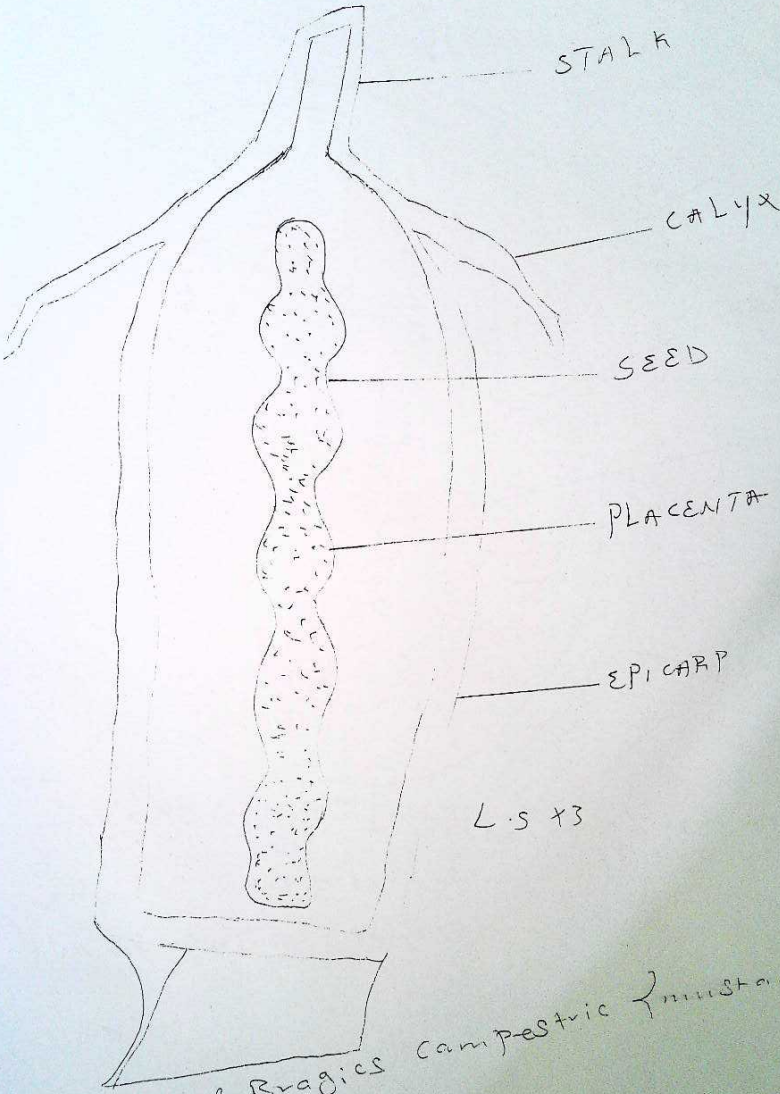
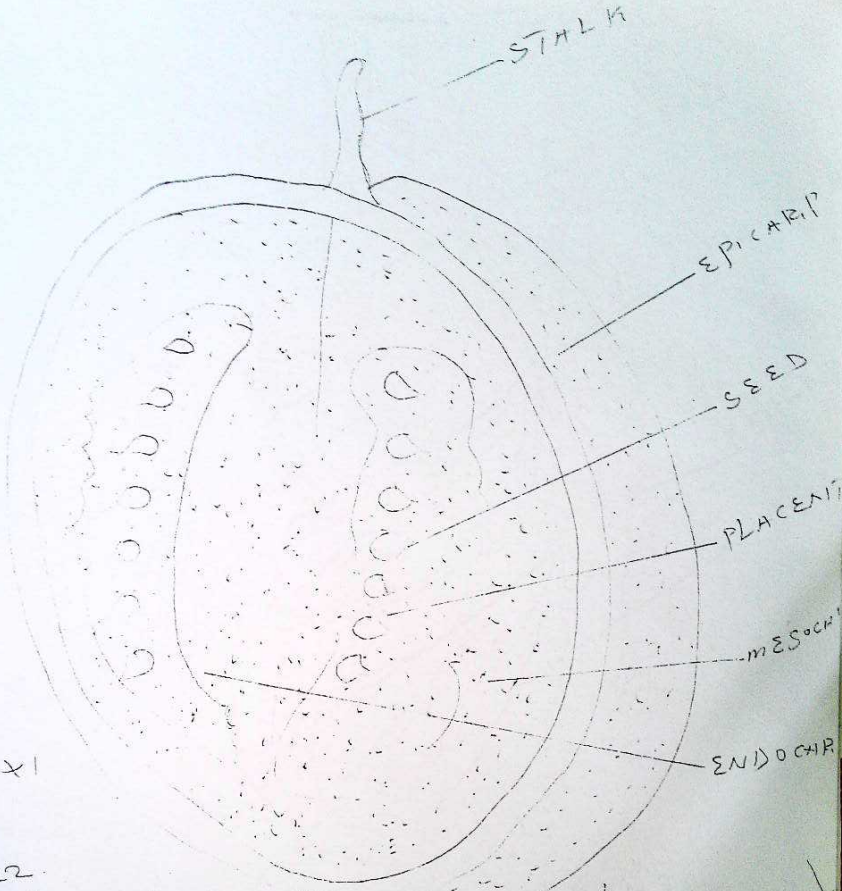


Fig 21 fruit of Brassica campestris {mustard}

family = Cruciferae

PLACENTATION = parietal



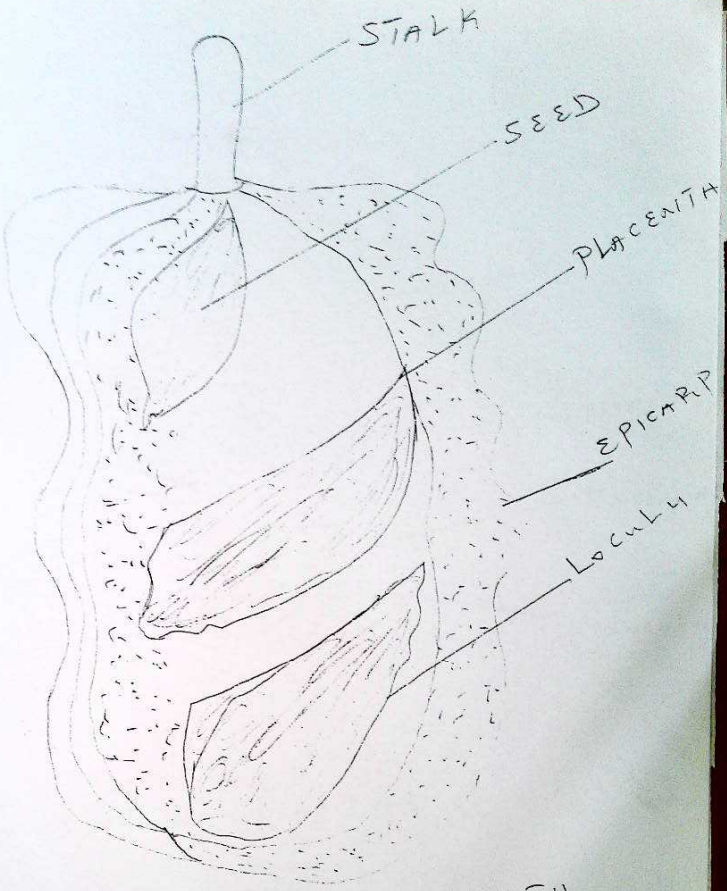
L S.I

ig 22.

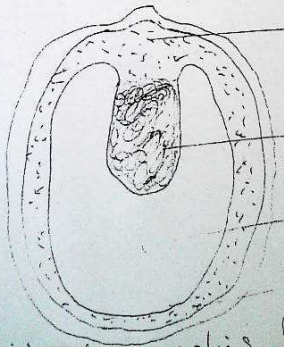
fruit of citrullus vulgaris (water melon)

Family: Cucurbitaceae

PLACENTATION = parietal

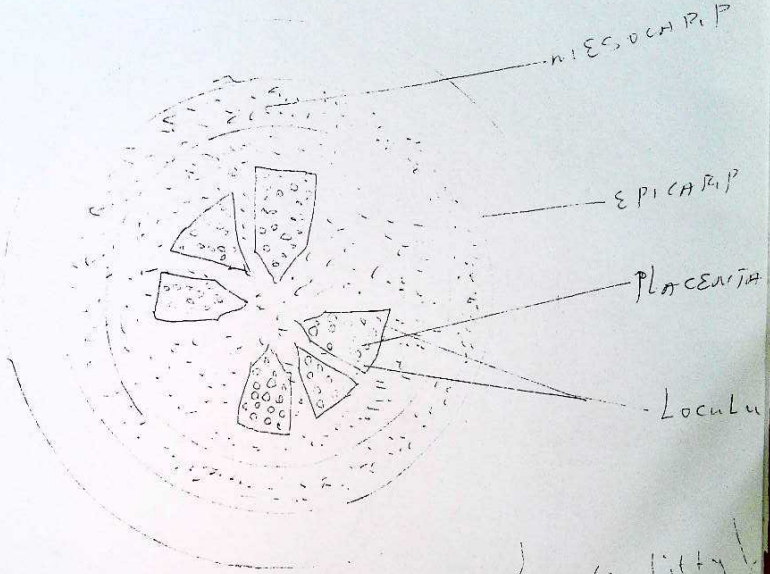


L.S x2



T.S x2

23. fruit of Arachis hypogaea (Groundnut)
family = Leguminosae
PLACENTATION = marginal

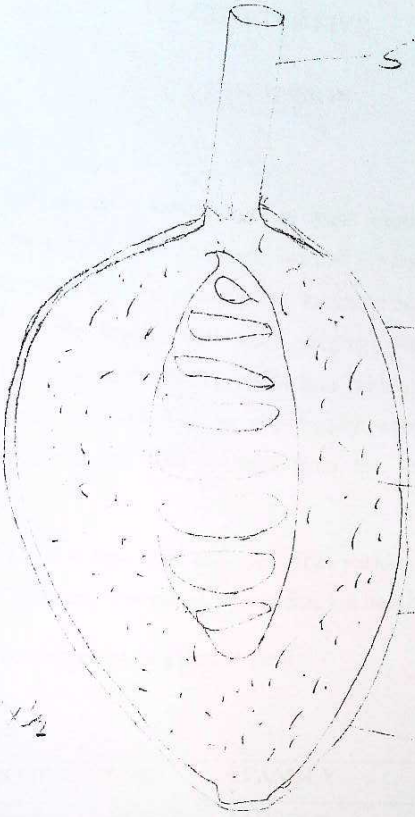


.5x2

Fig 24. fruit of Nymphaea lotus (water lily)

Family: Nymphaeaceae

Placentation: Superficial.



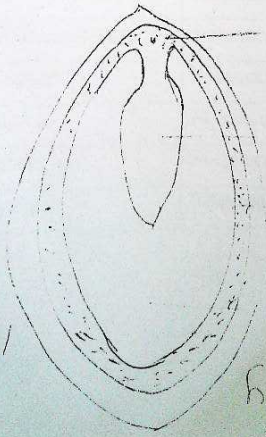


Fig 25 [illegible] of Delonix regia (Flamboyant)

CHAPTER FIVE

DISCUSSION

5.1 Analysis

In this investigation, various type of fruits were studied and their types of placetation were identified. It was found out that the fruits from plants of the same family have the same types of placentation. Example bean, flamboyant and ground nut from the family leguminosse with marginal placentation, apple (legume jumbos) and guave from the family myrta ceae with axile placentation, pumpkin water melon and cucumber from the family cucubitaceae with parietal placentation and coconut and palmnut from the family palmae with basal placentation.

Out of 25 fruit that were collected from various seed plants, 9 have axile placentation, 7 parietal, 3 marginal, 1 superficial, 4 basal and 1 apical.

This is shown below in a tabular form

S/N0	SCIENTIFIC NAME	FAMILY	PLACENTATION
1	Abelmoschus esculentum	Malvacea	Axile
2	Casuarins equisefi fruits	casuarineanc	"
3	Lyvopersium esculantum	Solanccene	"
4	Capsicum arinum	Solanccene	"
5	Psidium guajava	Myrtaceae	"
6	Solanum melongina	Solanccene	"
7	Citrus sincensis	Rutaceae	"

	Musa sapientum	Musaceae	"
	Malus sylvestris	Myrtaceae	"
	Thevati peruviana	Apacynacece	Partietal
	Cacumis sativus	Cucurbitacece	"
	Carica papaya	Cacicaceae	Partietal
	Theobrama cacao	Sterculiaceae	"
	Cucurbita pepo	Cucurbitaceae	"
	Brassica campestris	Cruciferac	"
	Citrullus vulgaris	Cururbitaceae	"
	Vigna sinensis	leguminosea	Marginal
	Arachis ninposigea	leguminosea	"
)	Delonix regia	leguminosea	"
)	Nymphae lotus	Nymphae	Superticial
1	Irivinfin gobonensis	Iruinigiaceae	Baseal
2	Cocos nucifera	Palmae	"
3	Mangifer indica	anacaradinacease	"
4	Elaeis guineesis	Palmae	"
5	Terminalia catapa	Combretaceae	Apical

5.2 Recommendations

The identifivation exercises has not been easy. Diagrams from text books only describe types of placentation in plants and give few simple examples but do not go into details to state the type of placentation in various fruits of the numerious angio sperms.

ecause of the complex nature of these placentation, mant students findix difficult identify them. In order to avoid this difficulty and to achieve the objective arlier stated in this project, the following recommendation are made:

a. The teaching of seed placenation, and of plant anatomy in general, should involve more of practical work to enable students understand the topic fully.
b. Students should be encouraged to do field work in the subject.
c. Further research should be to cussed on fruit of other economic seed plant of the college for the benefit of the students and others.

.3 Conclusion

he study has really revealed the different types of placentation that are found in ommon economic plant in Kuta Shiroro Local Government Area. It also revealed he importance of practical work.

he study has proved that placentation is an important as other su7bjects. It is of axonomic value as slated above that fruit from, the same finally have the same ype of placebntation. It is also related to other area like evolution, genetic etc.

he through understanding of seed placentation would be rewarding, not only to he research bur also to a good number of people in college and relevant institution.

EFERENCES

rber, B. (2010). Flowering plant origin and dispersal. Londn: Blandford press.

lucthe, M.A. (2009). Introduction plant Biology Iled Boston: McGrawtell/Higer Education.

NMES, G.H (2009). Taxonomy of vascular plants. New Delhi ford & IBH. Publishing co.

iifford, E.L (2008). Plant and society Boston: Mc Graw Hill. Companies.

iobel, T.M (2001). Anotomy of seed plants New York John wiley & sons Inc.

iroge, W.H (2000). Botany A functional Approach. New York: Macmillan Publishing Co. Inc.

lobertiendt, E.G (2007). Plant Anotarny: Comtemporary Biology London: Eward Arnold (Publisher) LTD.

ansky, S.H and others (2008) introduction to plant Biology 11 th.ed p. 222-225

.awrence, G.H. (2002) taxonomy of vascaular plants. P. 333-340

.eventin, E and Mc Mahun, K. (2000) plant and society 2nd ed. P. 180-185

.ouis, F.B (2011). Intermediate Botany. New York: The macmillan pree LTD

Muller, W.H (2006) botany: a functional approach .P. 129-135

Nilson, H.G (2012). Introduction to Botany. New York: Macmillan publishing Co.

Omotaye, T. (2010). Outlines and Pictures of seed plants from Nigeria. Lagos: University press.

Pandy, B.P. (2007) plant anatomy P. 331-334

Rost, Thomas .L. and others (2004) botany: a brief introduction to plant biology P. 158-160

Stern, K.R and others (2003) introduction plant biology P. 130-135

Takh Tajan, A. (2001) flowering plant origin and dispersal .P. 132-135

Teghon, H.T. (2010). Botany: A brief introduction to plant Biology. New York Macmillan Publishing Co.

Hartmann, N. T. and others (2005) plantscience: growth, development and utilization of cultivated plant .p 155-160

Weier, T.E (2000) an introduction to plant biology .P. 177-180.