

**O'ZBEKISTON RESPUBLIKASIN
OLIY VA O'RTA MAXSUS TA'LIM VAZIRLIGI
TOSHKENT VILOYATI
CHIRCHIQ DAVLAT PEDAGOGIKA INSTITUTI
BIOLOGIYA KAFEDRASI**

BOTANIKA FANI

Mavzu: O'simliklarning sporalar yordamida ko'payishi

Fan o'qituvchisi: b.f.n. Fayziyev V.B.

Chirchiq-2019

Garchi shuncha mag'rur tursa ham,
Piyolaga egilar choynak.
Shunday ekan, manmanlik nechun,
Kibru havo nimaga kerak?

Kamtarin bo'l, hatto bir qadam
O'tma g'urur ostonasidan.
Piyolani inson shuning-chun
O'par doim peshonasidan.

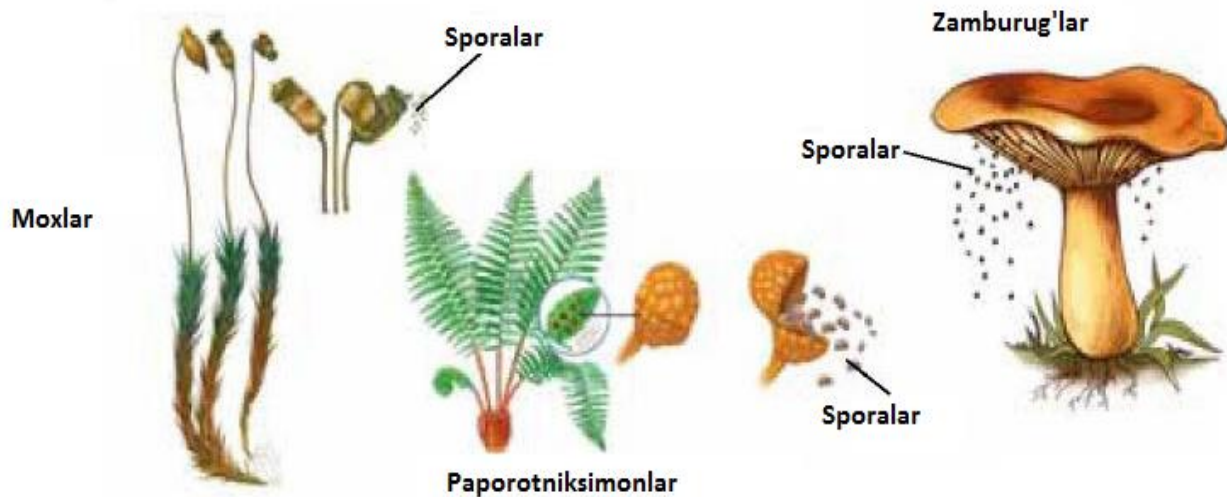
Erkin Vohidov

DARS REJASI:

- O'simliklarning jinssiz ko'payishi xillari.
- O'simliklarda jinsiy ko'payish.
- Nasllar gallanishi va ularning ahamiyati.
- ***Tayanch iboralar:*** jinsiy ko'payish, jinssiz ko'payish, spora, zoospore, mitospora, meyospora, sporangiy, gameta, xologamiya, izogamiya, anizogamiya.

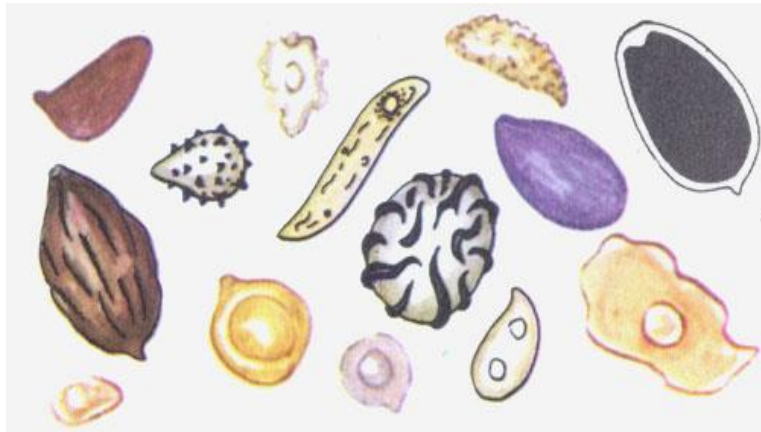
JINSSIZ KO'PAYISH:

- Jinssiz ko'payish **tuban** va **yuksak** **sporal** o'simliklar (**suvo'tlar, zamburug'lar, moxlar va paporotniklar**)ning hayotida uchraydi.

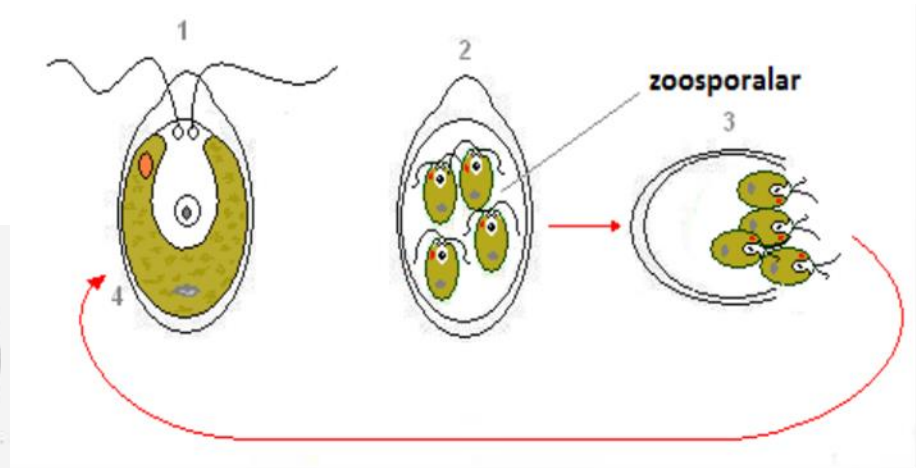


JINSSIZ KO'PAYISH:

- Jinssiz ko'payish maxsus hujayra ***spora*** yoki ***zoospora*** yordamida sodir bo'ladi.



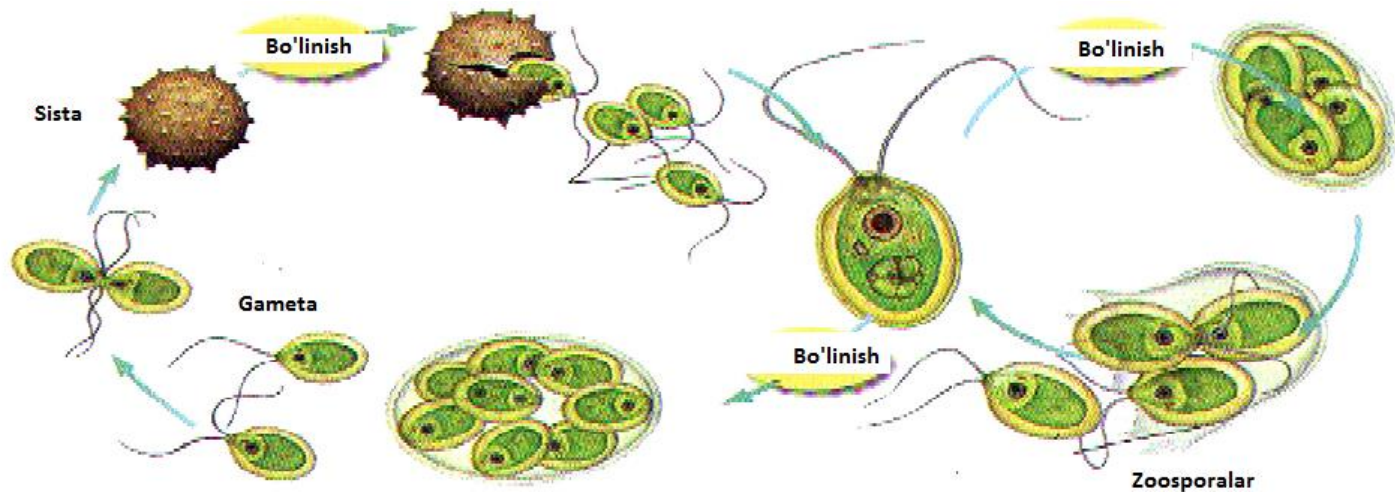
- ***Sporalar***



- ***Zoosporalar***

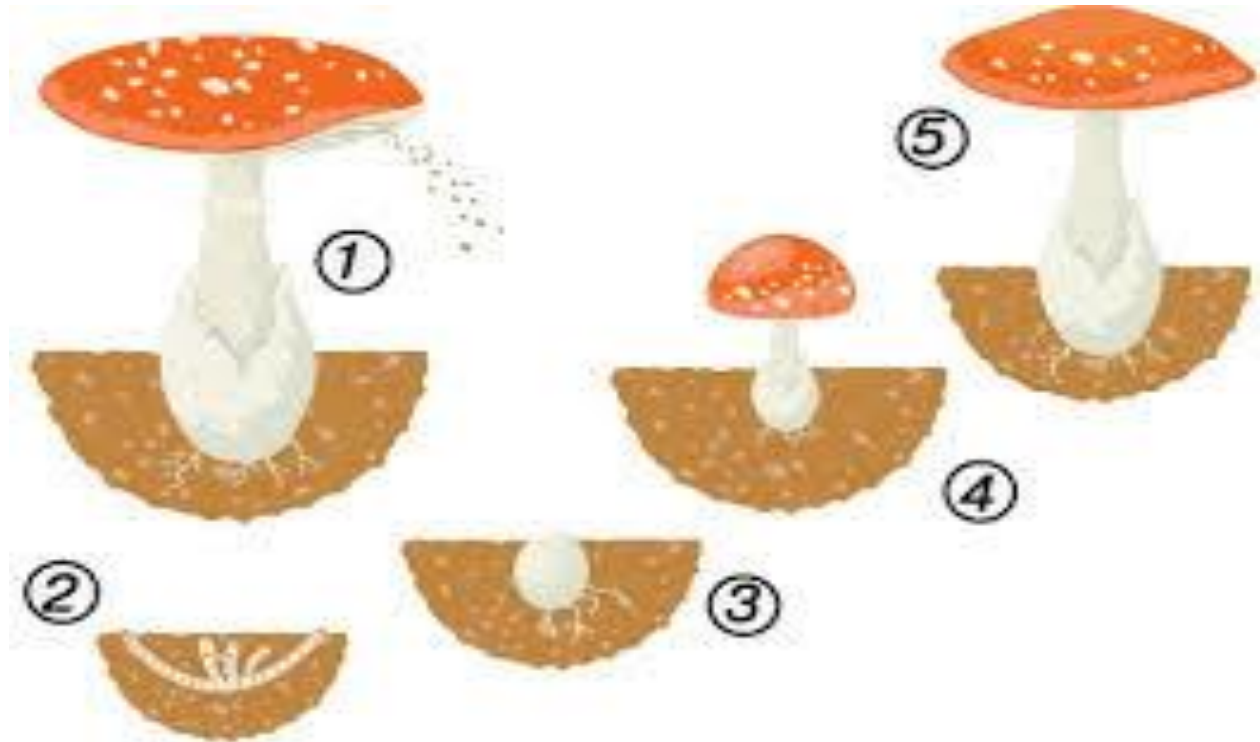
JINSSIZ KO'PAYISH:

- **Spora** va **zoospora** ona hujayra ichida **mitoz** yoki **meyoz** — reduksion (lot. r e — yangitdan: p r o d u k s i o — mahsulot) yo'l bilan bo'linadi. Shuning uchun spora va zoosporalar doimo **haploid** (yunon. x a p l o s — oddiy), ya'ni toq sonli xromosomaga ega bo'ladi.



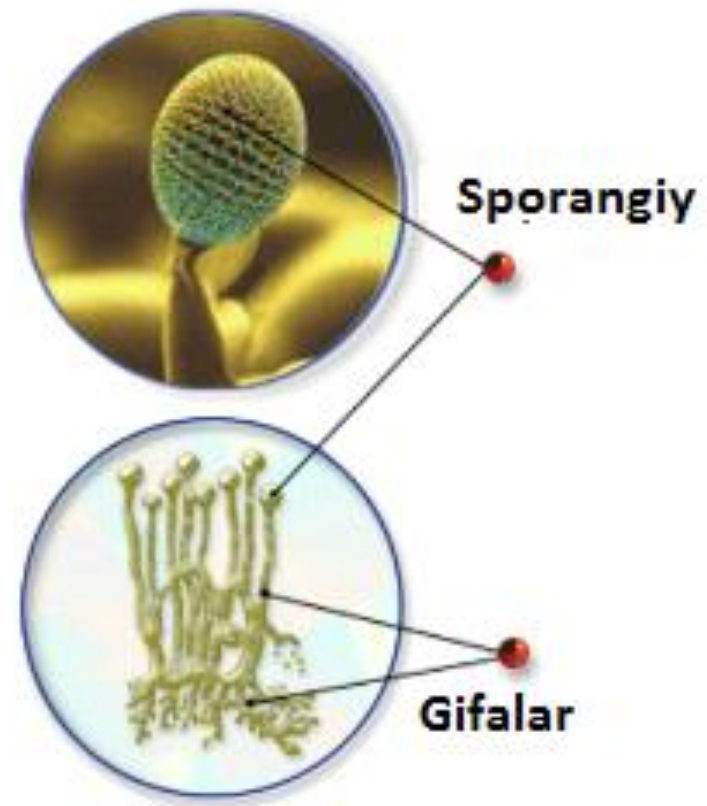
JINSSIZ KO'PAYISH:

- Mitoz yo'li bilan hosil bo'lgan sporalarni *mitospora* deb ataladi.



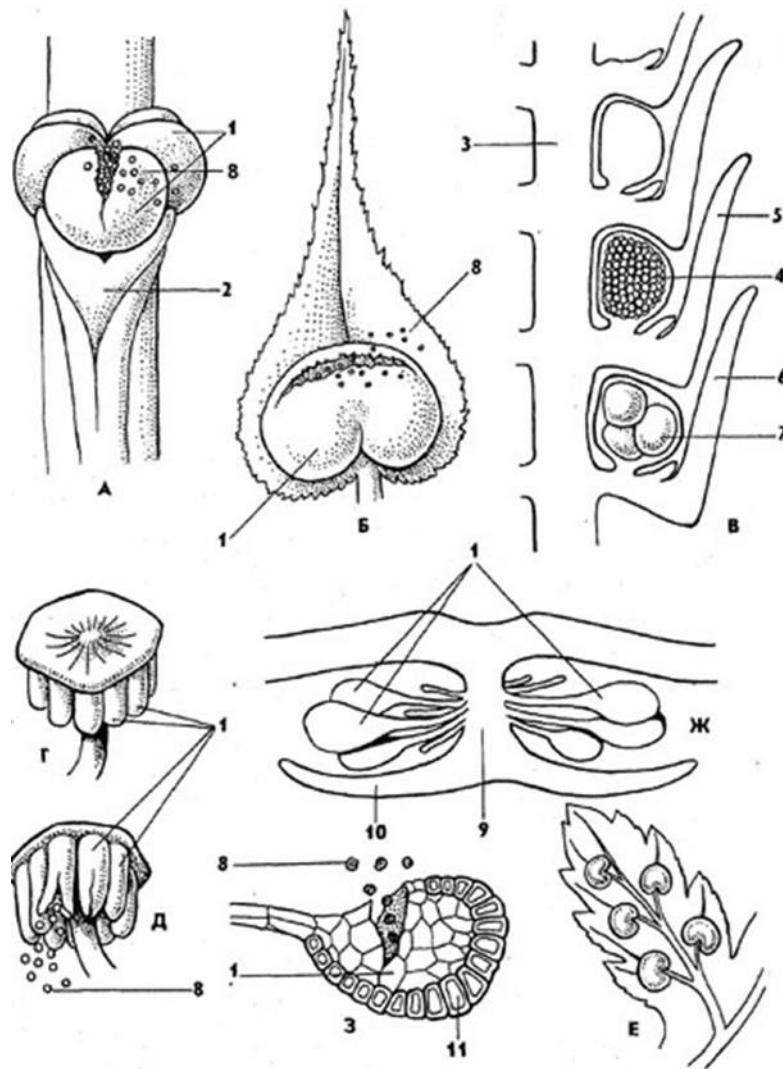
SPORANGIY:

- Spora *sporangiy* (yunon. angeon — nay), ya'ni maxsus xaltacha ichida hosil bo'ladi.



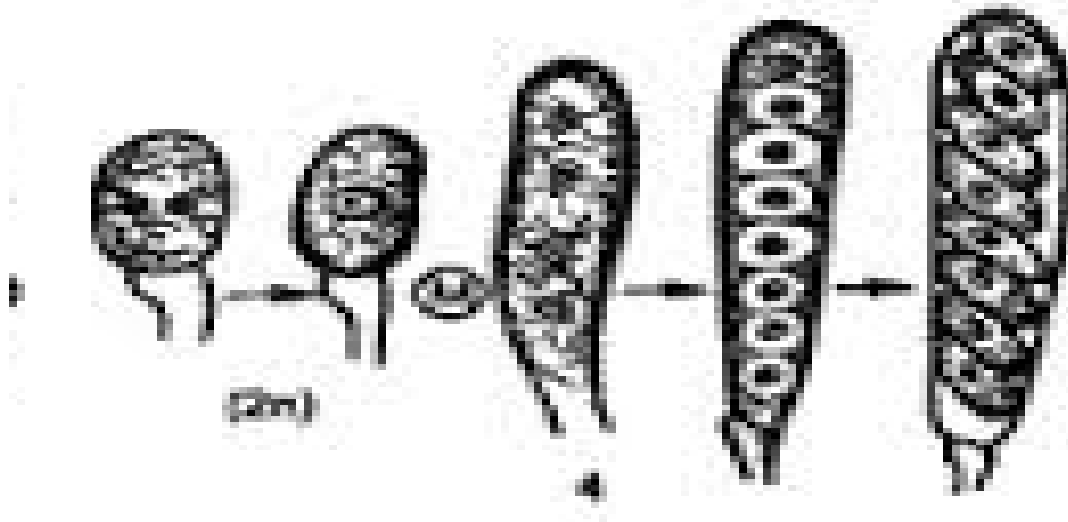
SPORANGIY:

- Sporangiy ***bir hujayrali*** va ***ko'p hujayrali*** bo'lishi mumkin.
- Bir hujayrali sporangiy ***tuban o'simliklarda***, ko'p hujayrali sporangiy yuksak ***sporali o'simliklarda*** uchraydi.



SPORANING HOSIL BO'LISHI:

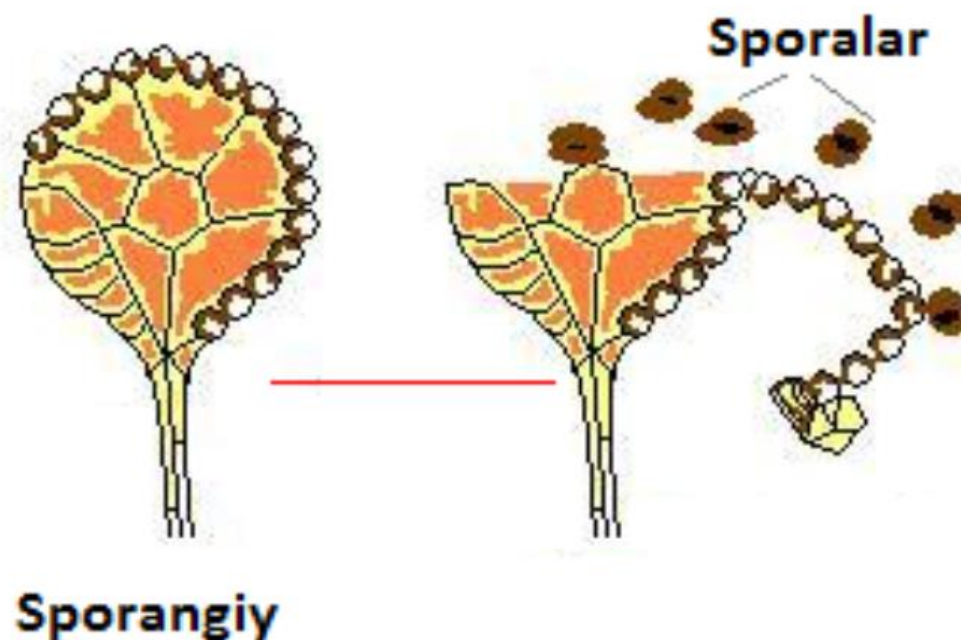
- Sporalar - **yosh sporangiy** ichidagi bitta hujayraning (to'qima) meyoz yo'l bilan bo'linishidan hosil qiladi.



- **Sporangiy ichida** sporalarning hosil bo'lish sxemasi

SPORANING TARQALISHI:

- Sporalar yetilgandan keyin sporangiy devori yirtiladi va undan otilib chiqqan yengil, juda ham mayda sporalar **shamol** vositasida tarqaladi va nam yerga tushgan spora o'sib **yangi individga** aylanadi.



SPORALI O'SIMLIKLAR:

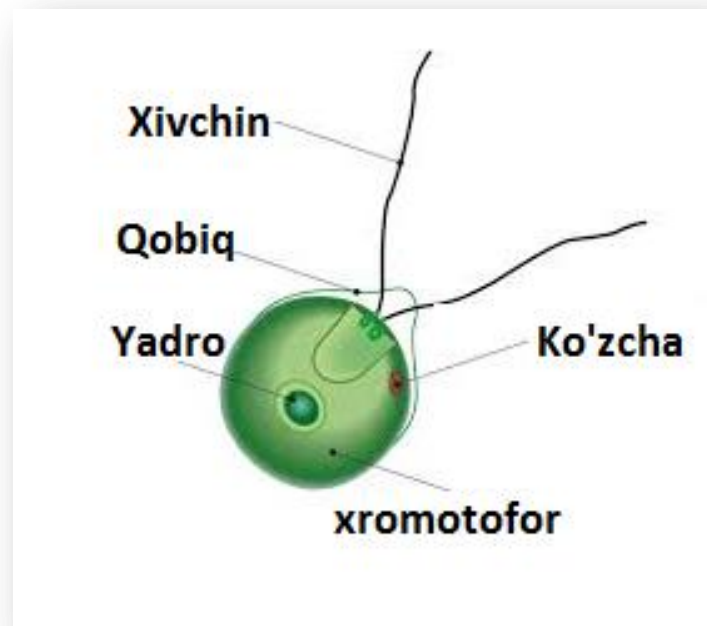
- Sporalar ba'zi **suvo'tlar** (**qizil suvo'tlar**), **zamburug'lar**, **yuksak o'simliklardan**: **yo'sinlar**, **qirqquloqsimonlar** (paparotniksimonlar) va **qirqbo'g'imsimonlarda** uchraydi.



- Spora yordamida ko'payish xususiyatiga ega bo'lgan o'simliklar **sporali o'simliklar** deb ataladi.

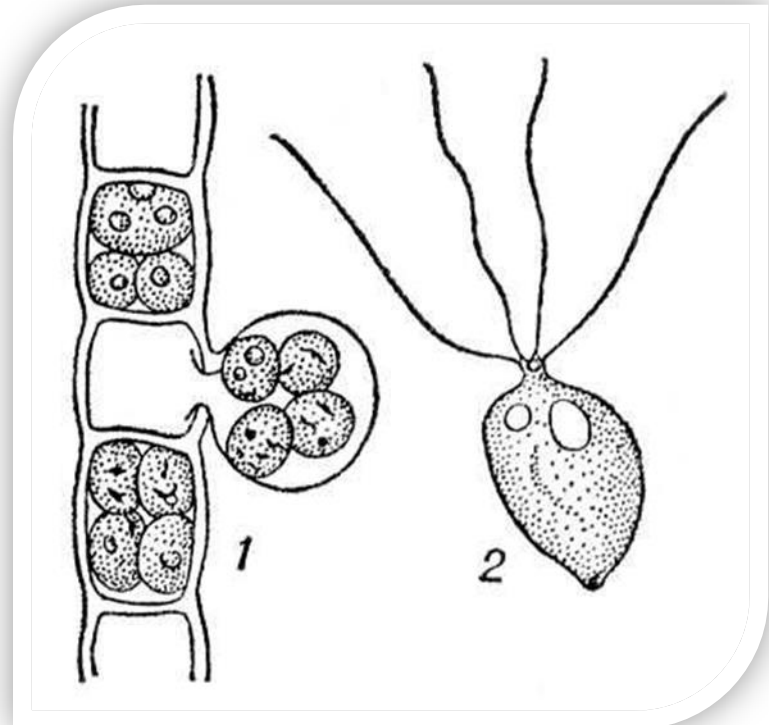
ZOOSPORALAR:

- Suv sharoitida o'suvchi tuban o'simliklarning sporalari xivchinli bo'lib, **zoospora** deb ataladi. Zoosporalarning ustida qattiq po'st **bo'lmaydi**. U harakatchan, uning harakati (1—2—4) ba'zan ko'p sonli xivchinlar yordamida sodir bo'ladi va **zoosporangiy** deb ataladigan maxsus hujayra ichida yetiladi.



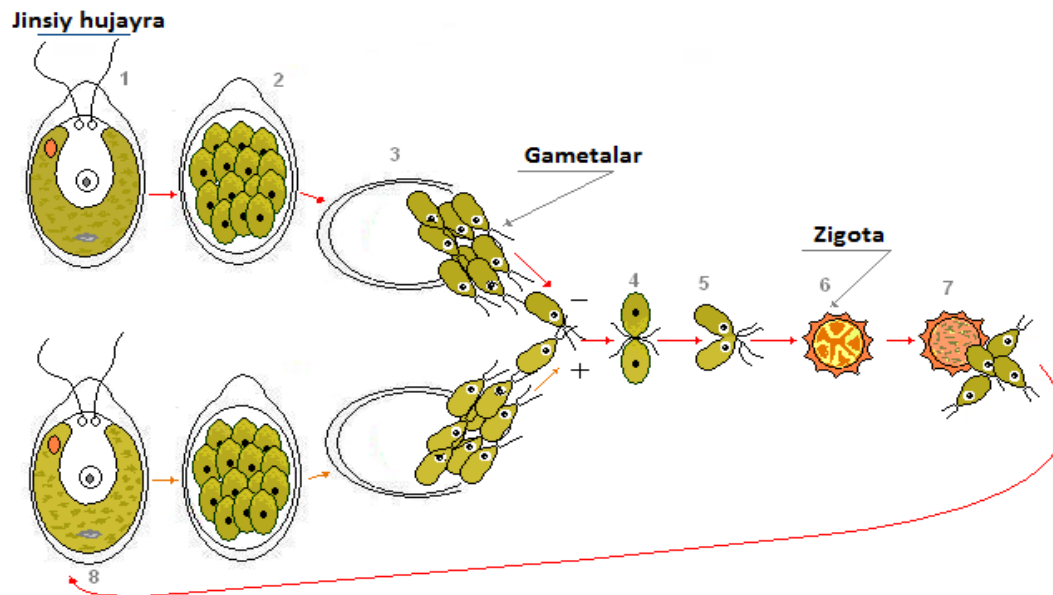
ZOOSPORALAR:

- Zoosporalar yetilgandan so'ng **zoosporangiy** devori bo'rtib, yirtiladi va zoosporalar suvga chiqib, suzib biror narsaga o'rnashib, xivchinlarini tashlab o'sadi va **yangi individga** aylanadi.



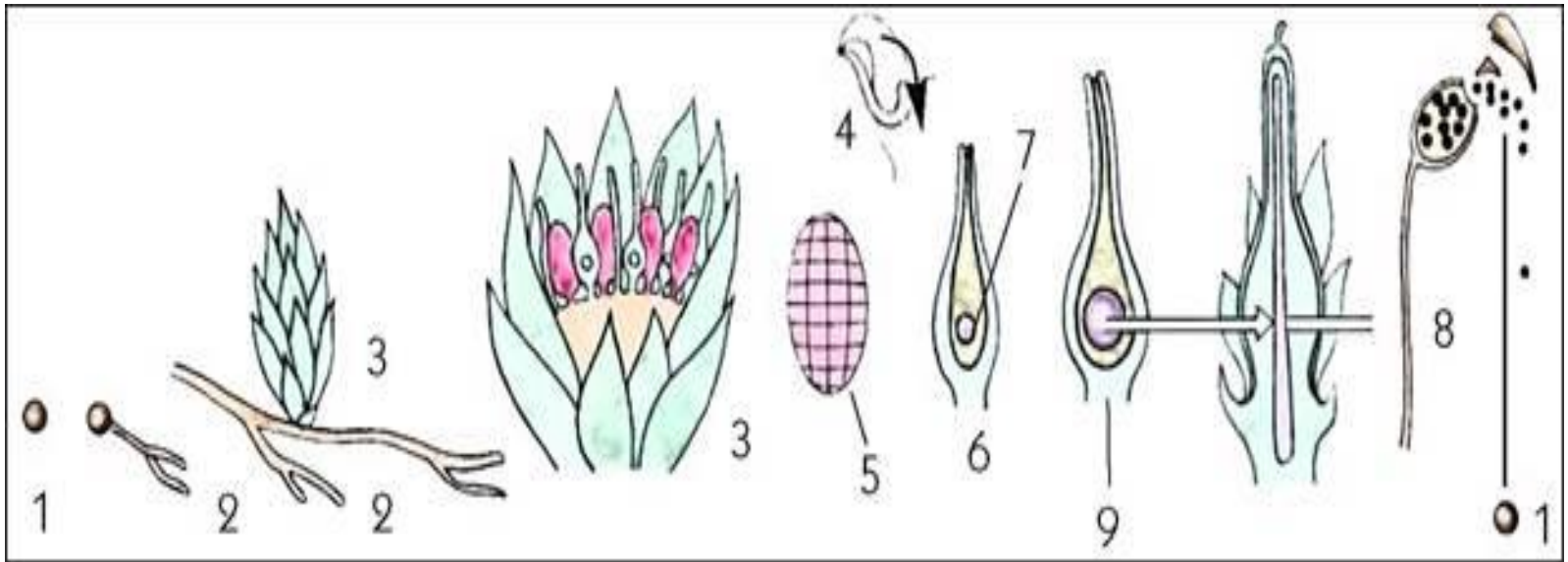
JINSIY KO'PAYISH:

- Tuban o'simliklarda jinsiy ko'payish ikkita harakatchan jinsiy hujayralar, ya'ni - **gametalar** (yunon. jinsiy hujayra) **protoplazmasi** va **yadrolarining** bir-biri bilan qo'shilishi, ya'ni **kopulyatsiya** (lot. k o p u l a s i o — juftlashish) natijasida vujudga keladi.



GAMETANGIY:

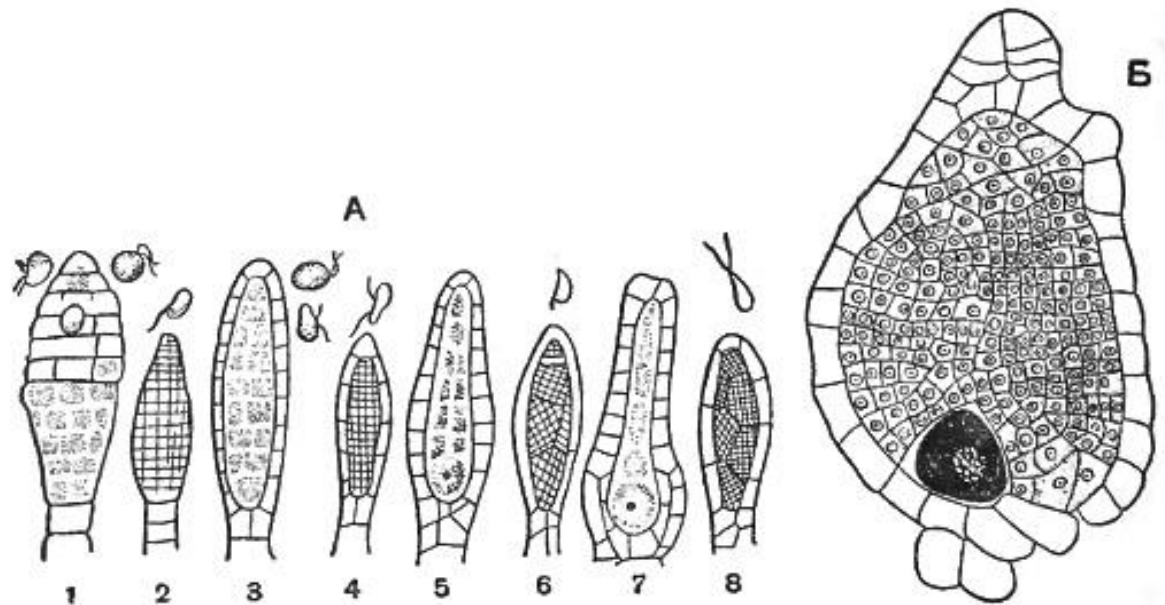
- Gametalar - ko'pchilik o'simliklarda maxsus hujayra **gametangiy** (yunon. a n g e y o n — nay)da yetiladi.



- Onalik gametangiyning umumiy ko'rinishi va rivojlanishi**

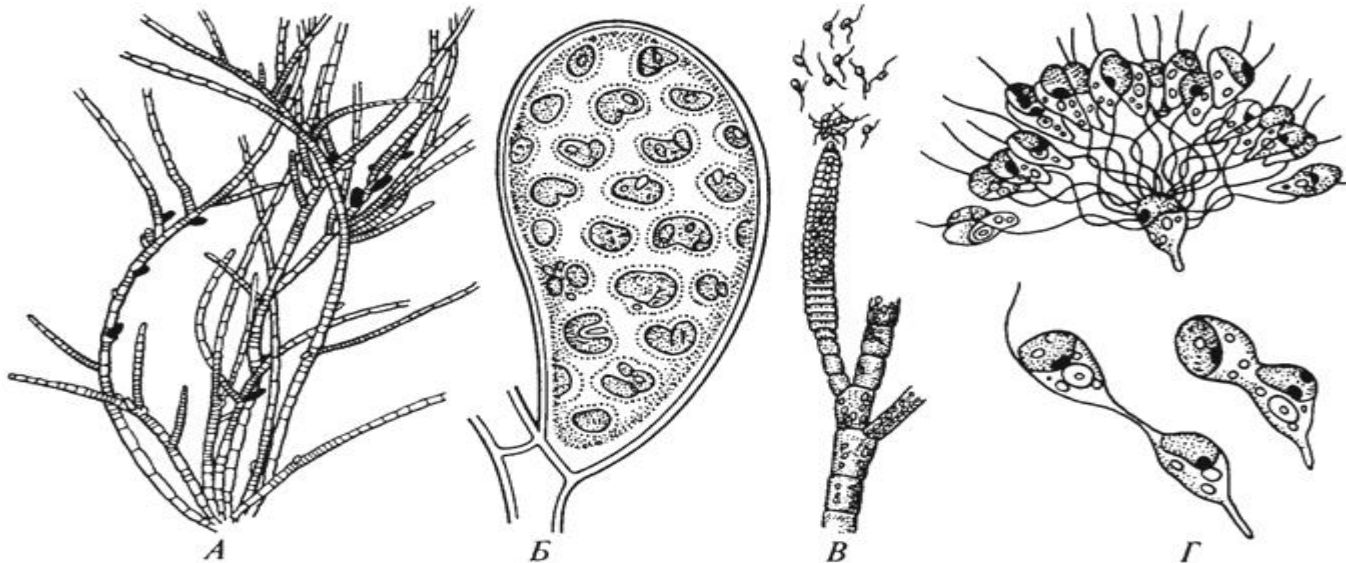
GAMETANGIY:

- Tuban o'simliklarda *birhujayrali*, yuksak o'simliklarda *ko'p hujayrali gametangiy* taraqqiy etadi.



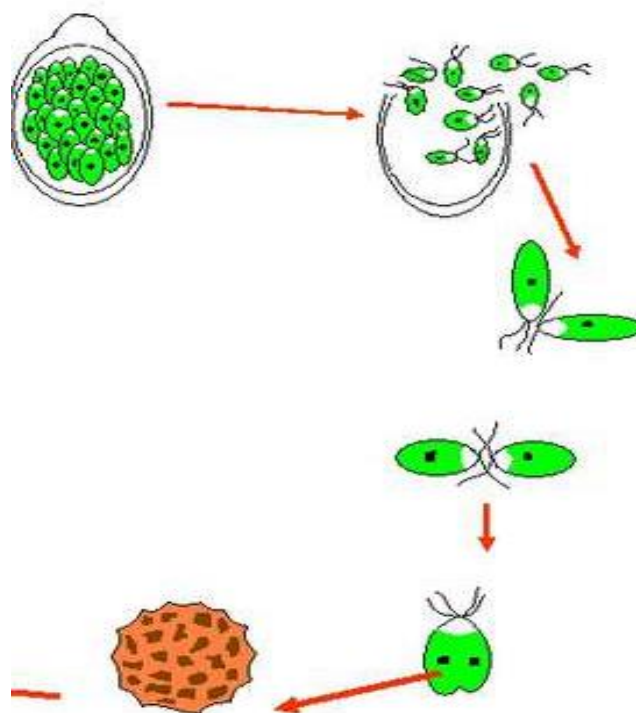
ZIGOTA:

- Gametalar yetilgandan so'ng gametangiy devori bo'rtib yirtiladi va suvga chiqadi. Suvda har xil tupdan chiqqan gametalar bir-biri bilan uchrasa, ular qo'shiladi va **zigota** hosil qiladi.



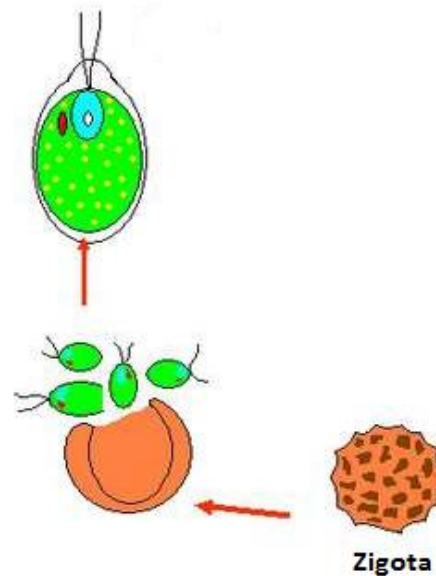
ZIGOTANING RIVOJLANISHI:

- Zigota ichida avvalo gametalarning **sitoplazmasi** (protoplazmasi) qo'shiladi, bunga **plazmogamiya** deb ataladi, keyinchalik ularning **yadrolari** **qo'shiladi** — bunga **kariogamiya** deb ataladi.



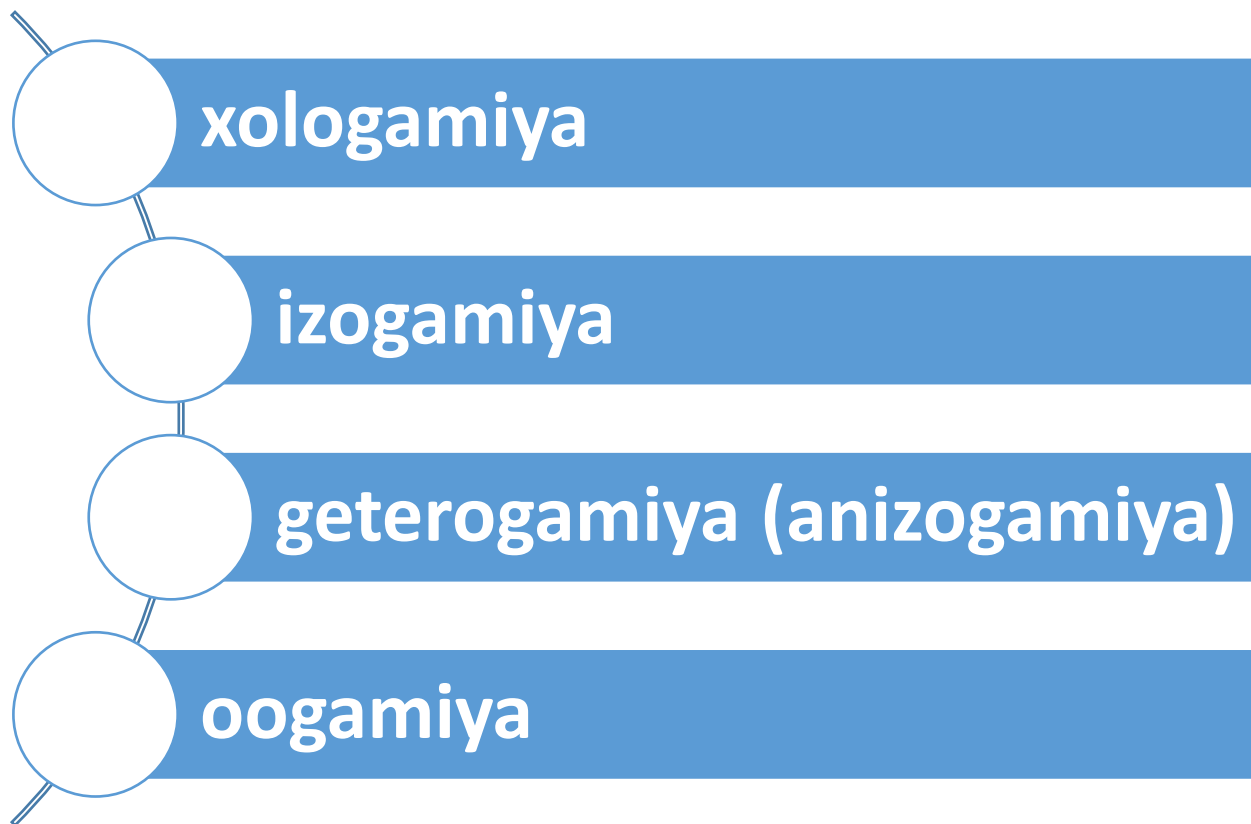
ZIGOTANING RIVOJLANISHI:

- Zigota tinchlik davrini o'tgandan so'ng, uning **diploid** (yunon. d i p l o o s — qo'shaloq) yadrosi reduksion (meyoz) bo'linib, xromosomalar soni **ikki barobar kamayadi**. Shundan so'ng **gaploid davr** boshlanadi.



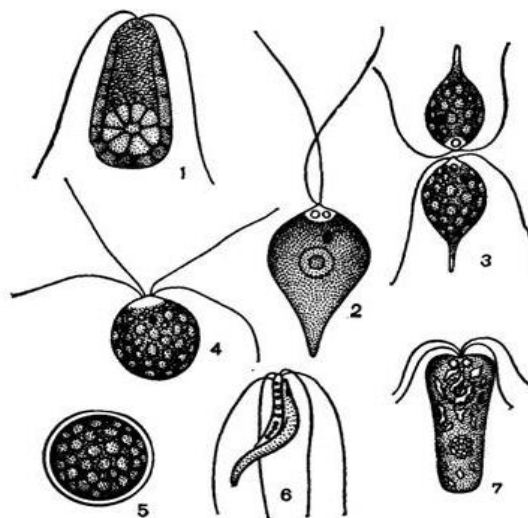
JINSIY KO'PAYISH XILLARI:

- O'simliklarda bir necha xil gametalar bo'ladi, shunga ko'ra bir necha xil jinsiy ko'payish uchraydi.



XOLOGAMIYA:

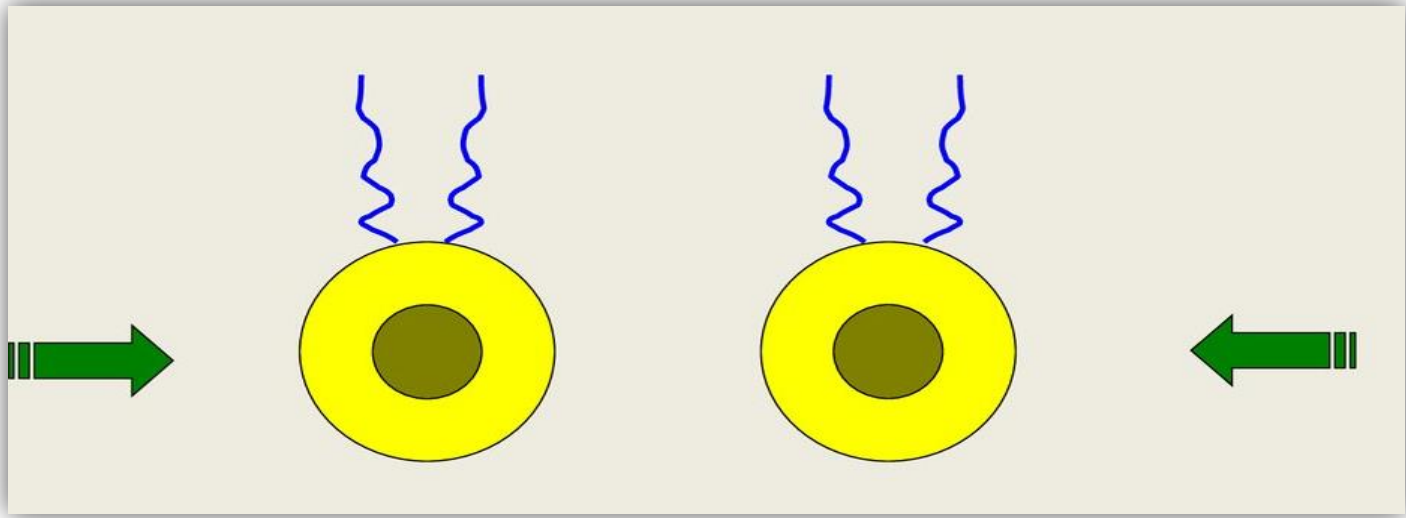
- **Xologamiya** (yunon. x o l o s — butun; g a m e o — qo'yilish) yo'li bilan ko'payish ba'zi birhujayrali organizmlarda masalan, **dunamella** degan suvo'tida uchraydi. Ularda **maxsus gametalar bo'lmaydi**, shuning uchun jinsiy ko'payish **bir-biriga o'xshash** vegetativ hujayralarining qo'shilishi natijasida sodir bo'ladi.



1-Dunamella salina; 2-5- Phyllocardium compianatum; (2-vegetativ hujayra, 3-gologamiya, 4-planozigota, 5-gipnozigota); 6-Spermatozopsis exsultans; 7-Pyramimonas reticulata.

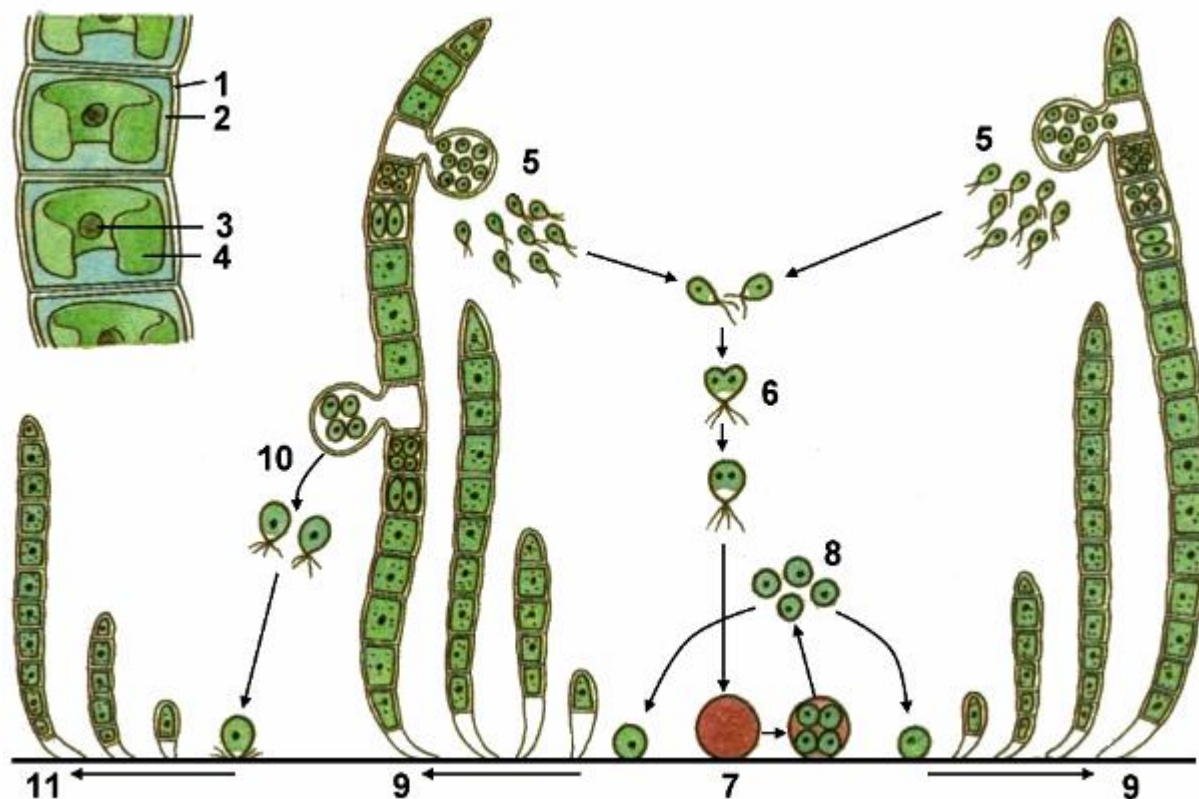
IZOGAMIYA:

- **Izogamiya** (yunon. i z o s — teng, g a m e o — qoʻshilish) koʻpayishning eng sodda shaklidir. Jarayon morfologik jihatdan farq qilmaydigan **harakatchan gametalarning** bir-biri bilan qoʻshilishidan sodir boʻladi.



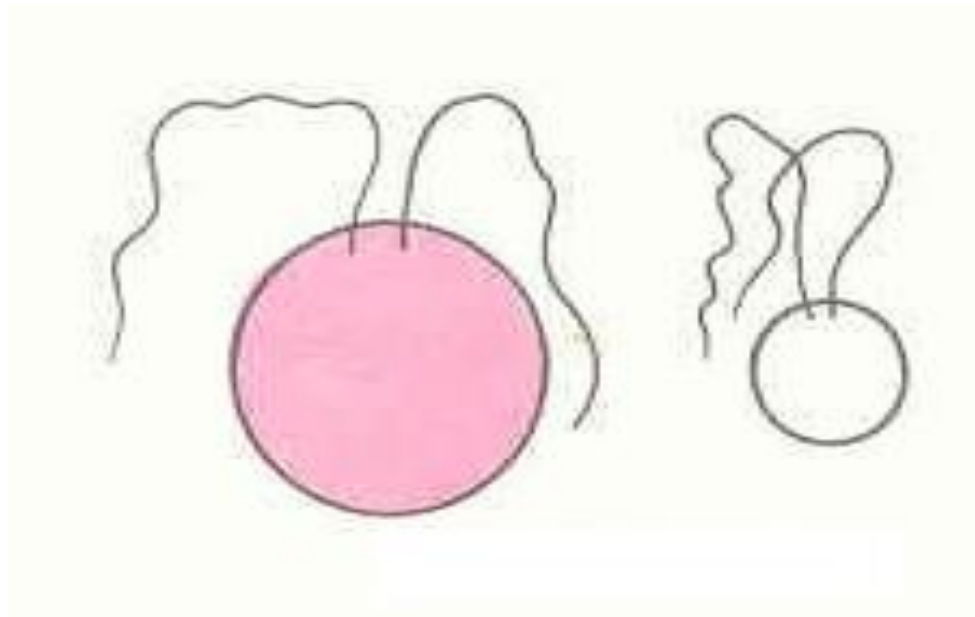
IZOGAMIYA:

- Izogamiya suvo'tlarda (*xlamidomonada*, *ulotriks*, *qo'ng'ir suvo'tlardan fukus* va *tuban zamburug'larda*) ko'rinadi.



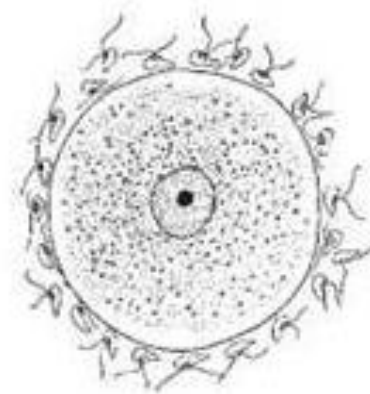
GETEROGAMIYA (ANIZOGAMIYA)

- **Anizogamiya** yoki **geterogamiya** (yunon. a n i z o s - notekis, tengsiz; g e t e r o s — turlicha; g a m e o — qo'shilish), ya'ni **shakli har xil, biri kichikroq va serharakat, ikkinchisi katgaroq** va sust harakat qiluvchi gametalarning bir-biri bilan qo'shilishiga **anizogamiya** yoki **geterogamiya** deb ataladi.



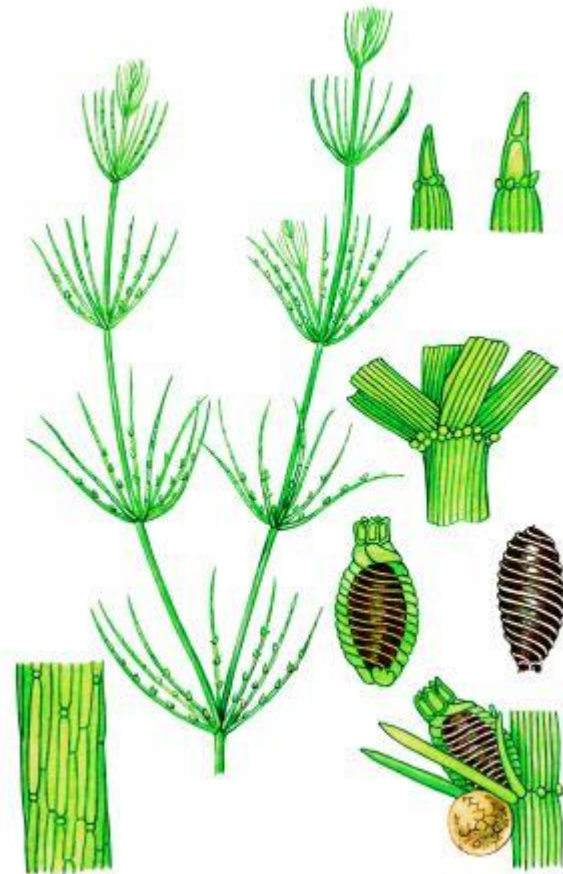
OOGAMIYA:

- **Oogamiya** (yunon. oon — tuxum, gameo — qo'shilish, hosil bo'lish). Katta, harakatsiz urg'ochi **tuxum hujayra** bilan harakatchan kichik **erkak jinsiy hujayraning** qo'shilishiga **oogamiya** deb ataladi.



OOGONIY:

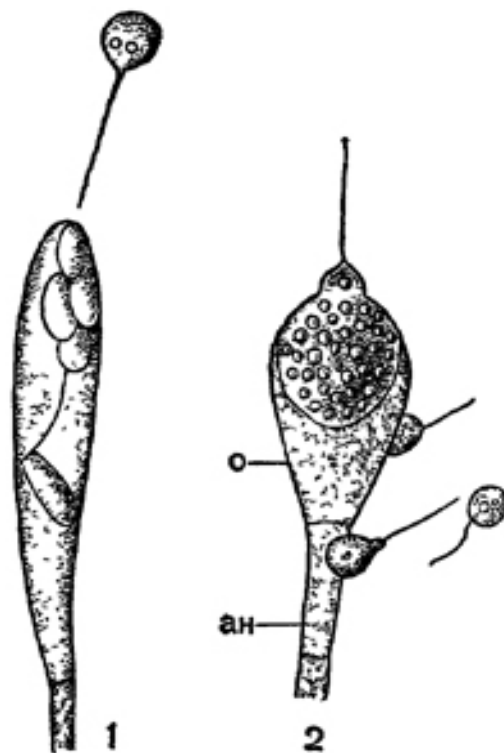
- Harakatsiz yirik tuxum hujayra oziq moddalarga boy. Uni *oogoniy* yoki *urg'ochi gameta* deb ataladi.



Xara o'simligining tuxum hujayrasi

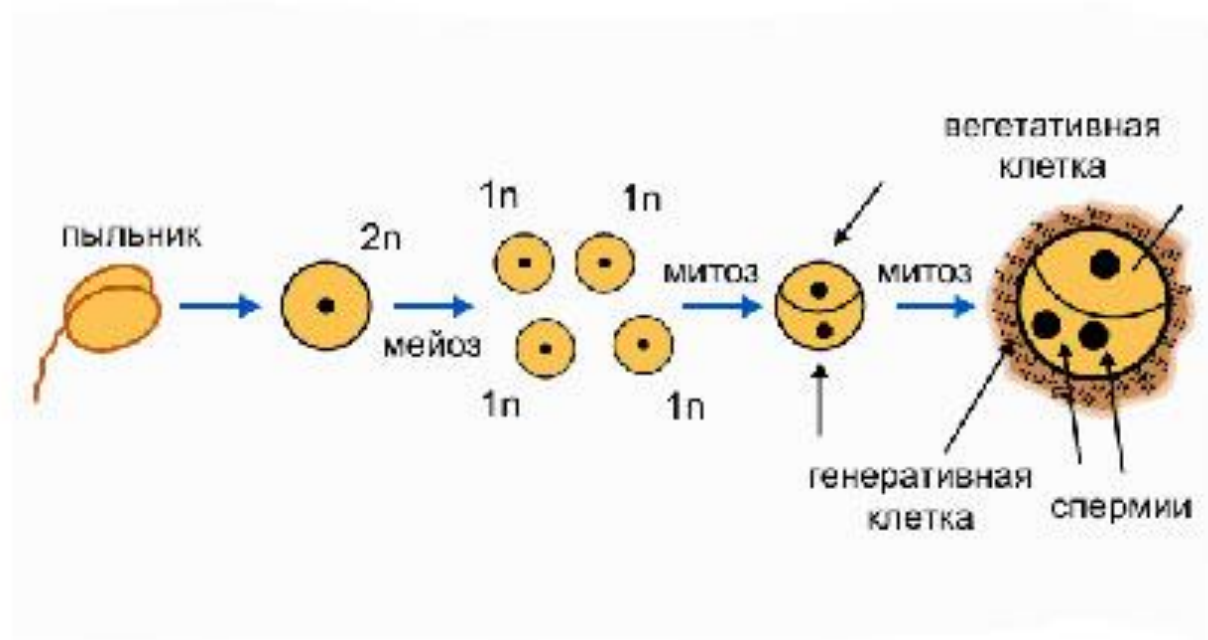
SPERMATOZOID:

- Ikkinchi gameta, kichik, harakatchan xivchinli bo'lib, bitta **yirik yadro** va **sitoplazmadan** iborat. Uni **erkak gameta** yoki **spermatozoid** (yunon. s p e r m a — urug') deb ataladi.



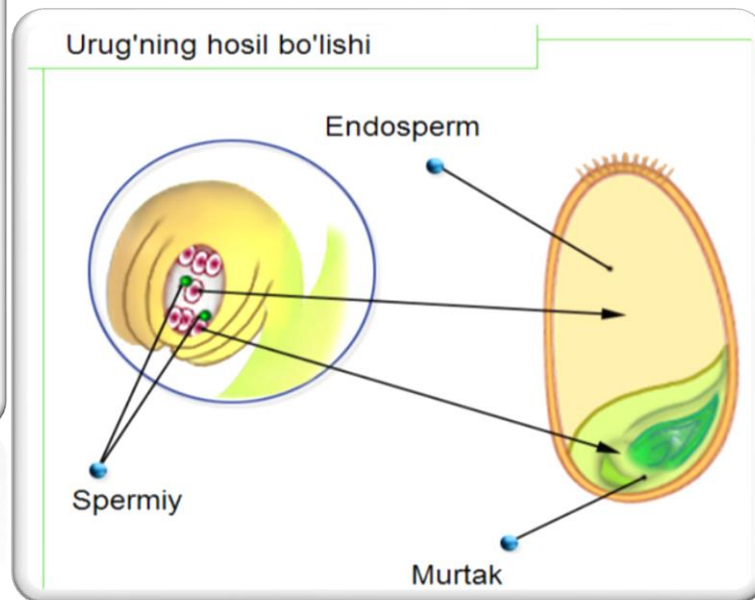
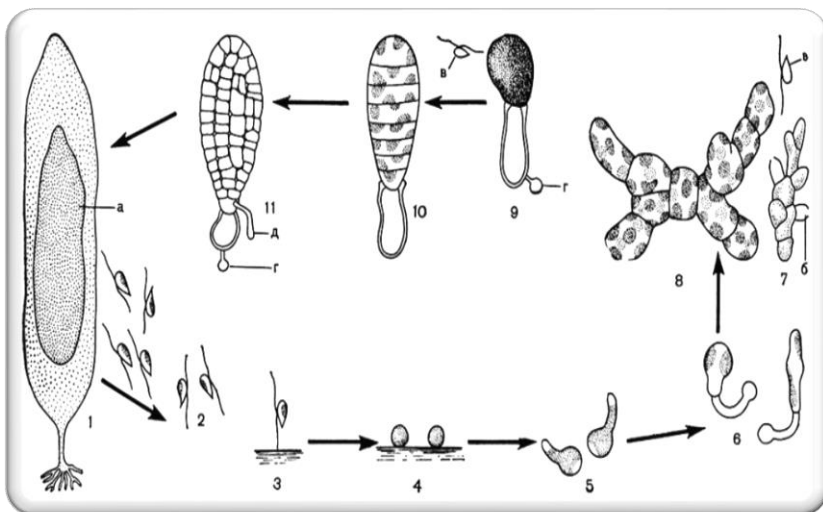
SPERMATSIYA:

- Evolyusiya jarayonida ko'pchilik urug'li o'simliklarning erkak gametalari xivchinlarini yo'qotgan. Bunday erkak jinsiy hujayra *spermatsiya* deb ataladi.



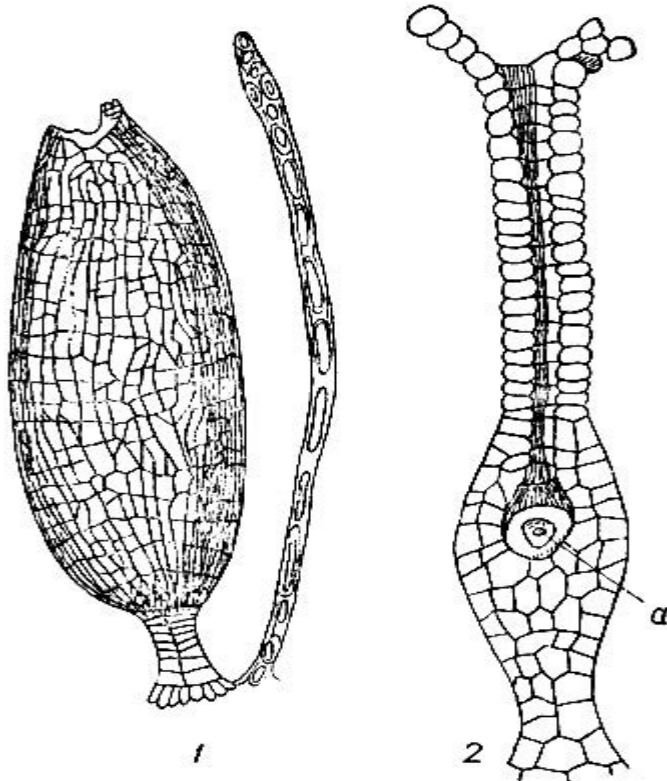
TUXUM HUJAYRA HOSIL BO'LADIGAN JOY:

- Tuban o'simliklarda tuxum hujayraning hosil bo'ladigan joyi ***oogoniya***, urug'li o'simliklarda — ***arxegoniya*** (yunon. a r x e — boshlanish; gone — yaratish, tug'ilish) deyiladi.



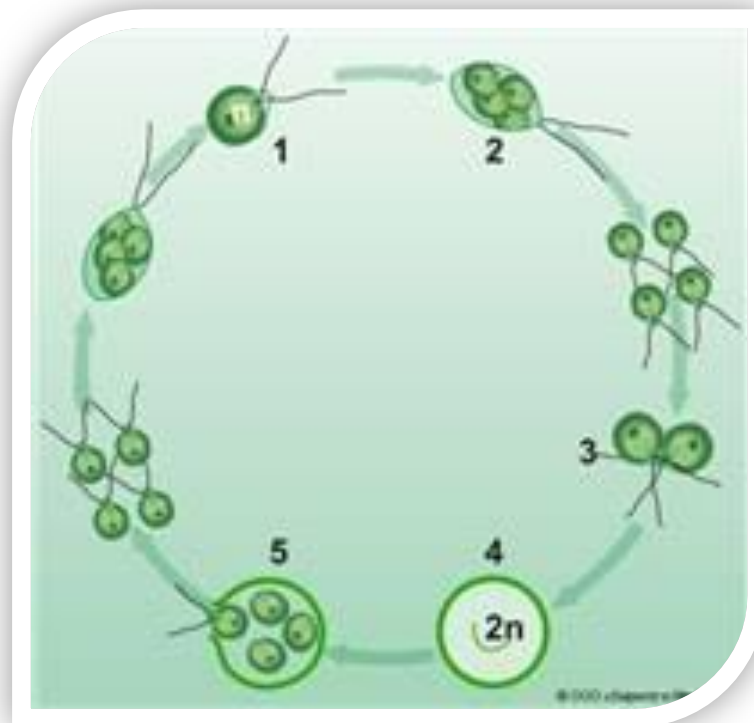
ANTERIDIY:

- Spermatozoid yoki sperma hosil qiluvchi organ **anteridiy** (yunon. a n t e r o s — gullovchi) deb ataladi.



YADRO DAVRLARINING ALMASHINUVI:

- Jinsiy ko'payadigan har bir o'simlikning hayotida yadro davrlari: **gaploid** va **diploid** davrlari gallanadi, ya'ni hujayraning qo'shilishi — **kopulyatsiya** etilishi natijasida xromosomalarning soni ikki marta ortganini ko'ramiz.



YADRO DAVRLARINING ALMASHINUVI:

- Jinsiy ko'payish vaqtida yadro ichidagi xromosomalar bir-biri bilan qo'shilmaydi, aksincha xromosomalar soni ikki barobar ko'p ($2n$) bo'ladi, bunday yadro **diploid** yadro deyiladi.



JINSIY KO'PAYISHDA YADRO:

- Aksincha xromosomalarning soni ikki barobar kam (p) bo'lgan gameta yadrolari **gaploid** deb ataladi. Gaploid yadroning **diploid yadroga** aylanishi **jinsiy ko'payish** vositasida yuzaga kelsa, buning aksi, diploid yadroning **gaploid** yadroga aylanishi ham yadroning reduksion bo'linishi natijasida **to'rtta gaploid** xromosomal hujayrada hosil bo'ladi.

DIPLOBIONT O'SIMLIKLAR:

- O'simliklar hayotida reduksion bo'linish (meyoz) har xil bo'lishi mumkin. Masalan, qo'ng'ir suvo'tlaridan *fukusning* har bir individi ***diplobiond*** bo'lib, uning har bir hujayrasi ***diploid*** xromosomadan iborat.



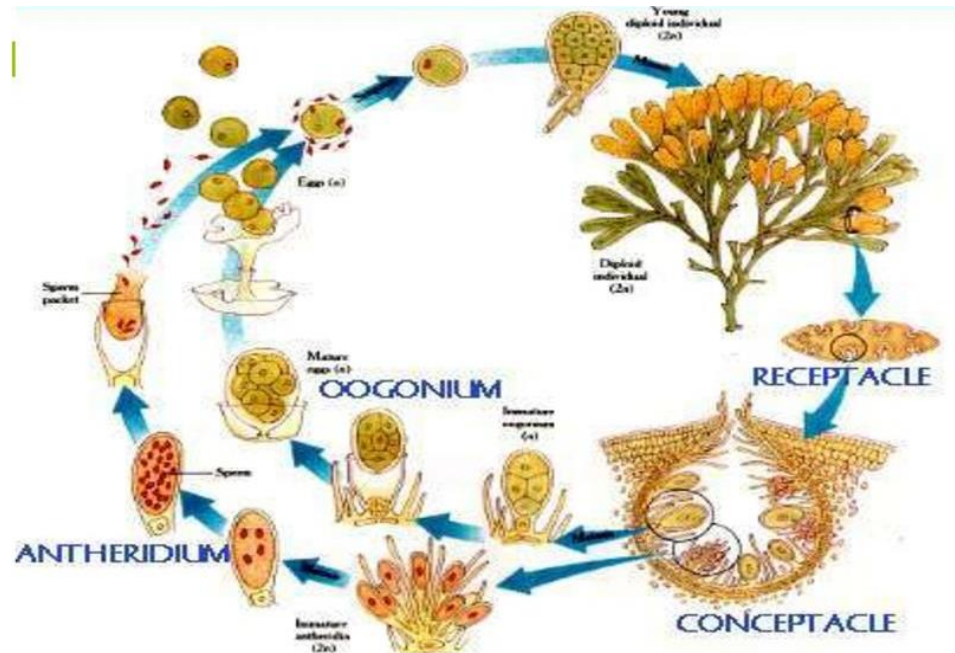
RETSEPTIKUL:

- Fukus jinsiy ko'paygan vaqtida tallomining uchlarida rangi ochiq — **sarg'ish, pushti shishlar** yuzaga keladi. Ularning ichi bo'sh bo'lib, **retseptakul** deb ataladi.
- Keyinchalik uning ichida **8 ta tuxum hujayra** — **oogoniya** va **anteridiydan 64 ta spermatozoid** rivojlanadi.



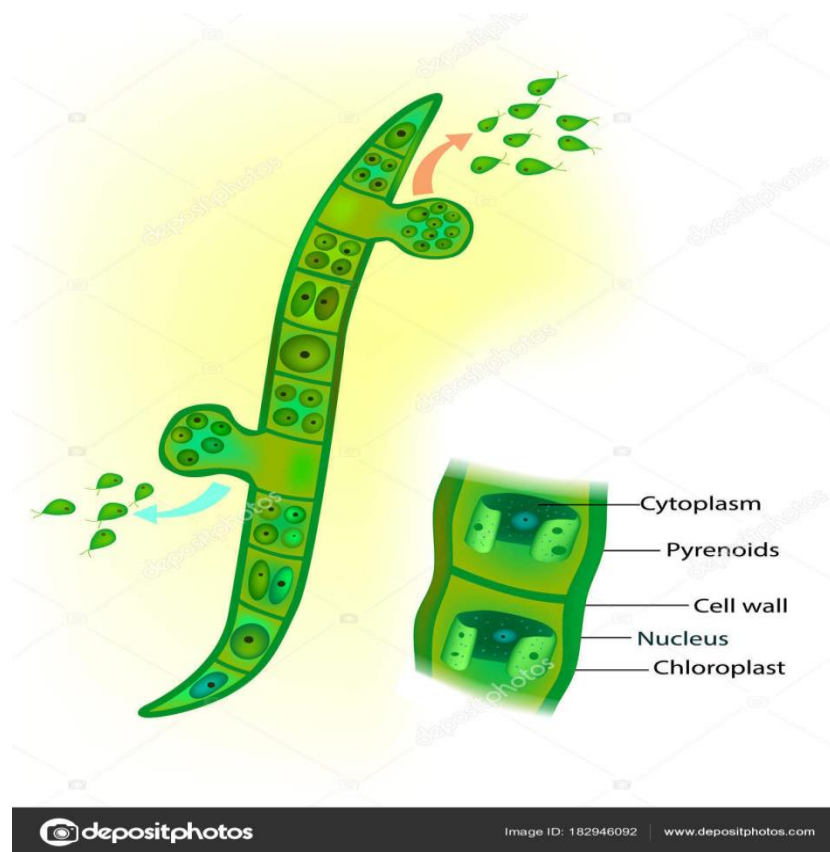
FUKUSNING JINSIY KO'PAYISHI:

- Spermatozoidlar tuxum hujayra atrofini o'rab, ularning bittasi tuxum hujayra bilan qo'shiladi va diploid xromosomaga ega bo'lgan **zigota** hosil bo'ladi. Zigota qalin po'st bilan o'ralib o'sadi va yangi diploidli fukusga aylanadi. Diploid miqdorida xromosomalari bor o'simliklar **diplobiont** deb ataladi.



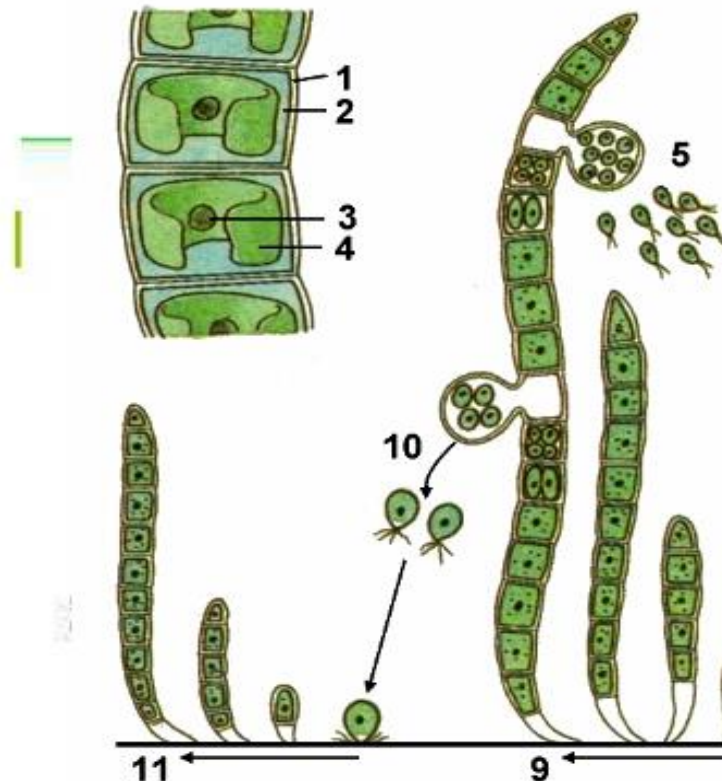
GAPLOBIONT O'SIMLIK:

- Yashil suvo'tlaridan **ulotriksning** har bir yashil ipsimon individi **gaplobiont** bo'lib, har bir hujayra yadrosi **gaploid** xromosomalardan iborat.



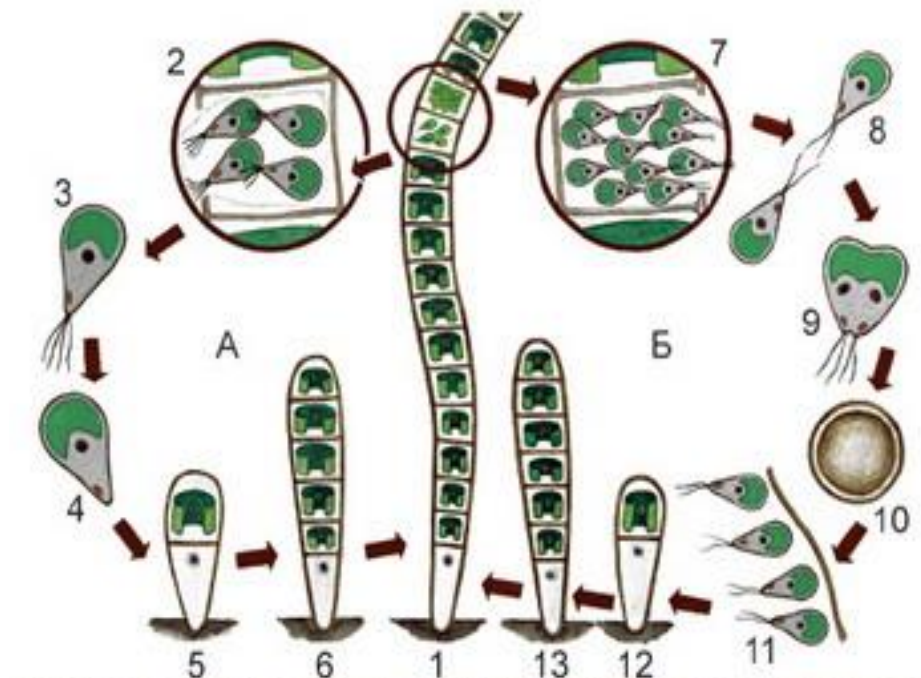
GAPLOBIONT O'SIMLIK:

- Jinsiy ko'payish vaqtida har bir hujayra mitoz yo'l bilan bo'linib, *gaploid* gametalar hosil qiladi.



ULOTRIKSNING JINSIY KO'PAYISHI:

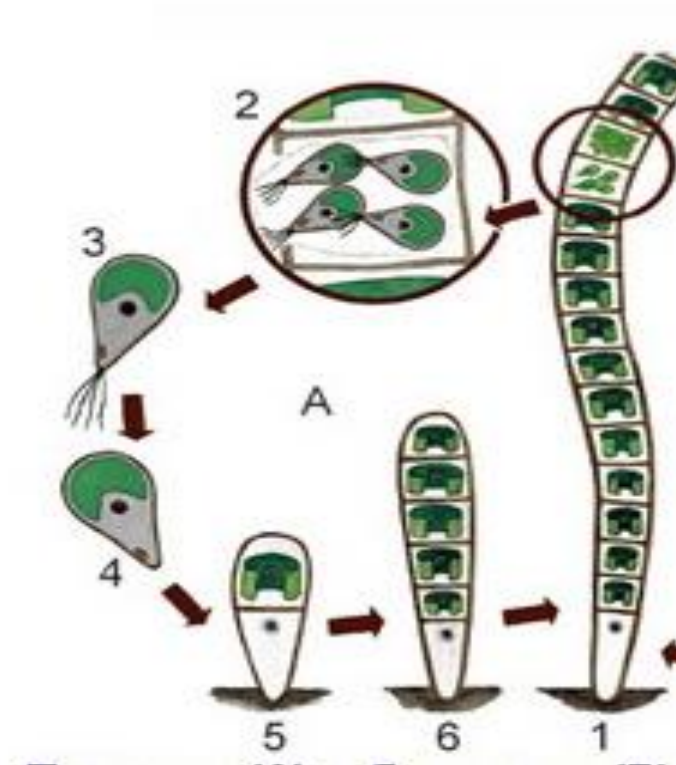
- Gametalar ***gametagoniydan*** chiqqach suvda harakat qilib, har xil tubdan ajralib chiqqan gametalar bilan uchrashib qolsa, ***kopulyatsiya*** jarayoni kuzatiladi va undan so'ng to'rt xivchinli harakatchan ***zigota*** (***planazigota***) rivojlanadi.



Половое (А) и бесполое (Б) размножение улотрикса

ULOTRIKSNING KO'PAYISHI:

- **Zigota** qalin po'st bilan o'raladi va tinchlik davrini o'tgandan so'ng, uning **diploidli** yadrosi reduksion bo'linadi va to'rtta **haploid** yadroga ega bo'lgan yangi individ o'sadi.

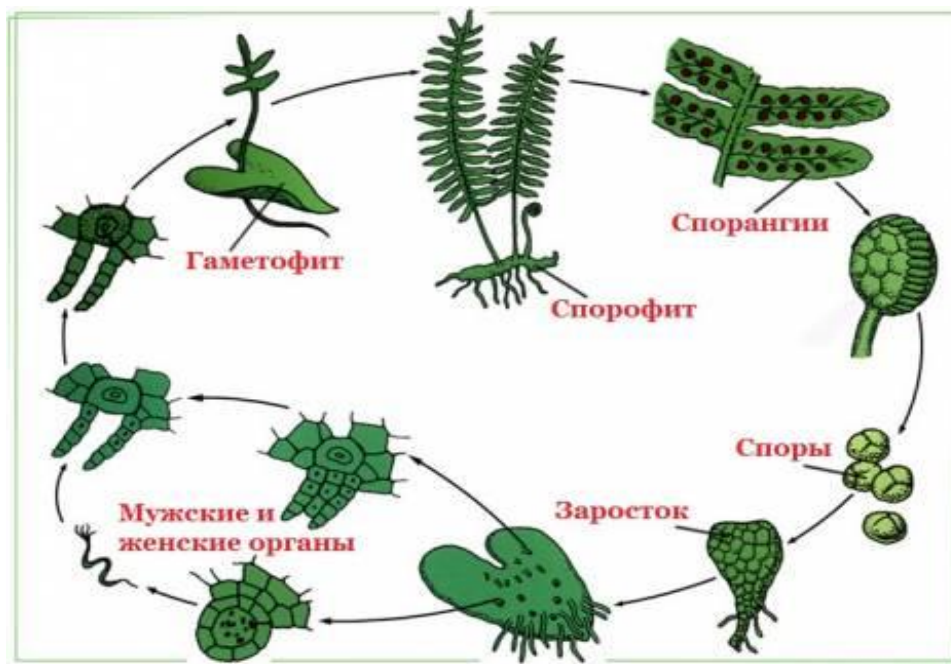


NASLLAR GALLANISHI:

- Ko'pincha tuban va barcha yuksak o'simliklarda yadro davrlarining (***gaploid*** va ***diploid***) almashinishi juda ham murakkab bo'lgan nasllarning almashinishi (***gaplobiond*** va ***diplobiond***) bilan bog'liq.

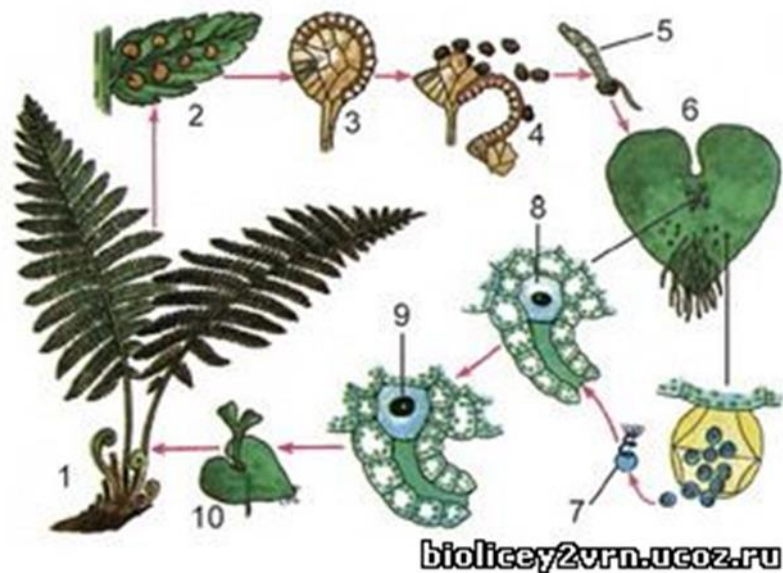
NASLLAR GALLANISHI:

- Bunda bir nasl rivojlanishi ustun bo'lib, ikkinchisi esa morfologik tuzilishi va xromosomalarning miqdori jihatidan ham, yashash jihatidan ham kamroq takomillashgan bo'ladi.



NASLLAR GALLANISHI:

- Naslarning gallanishi — organizmning yashash davrida **ikki xil nasl** paydo bo'lishi, ya'ni **jinssiz** va **jinsiy** ko'payish bilan bog'langan. **Jinssiz nasl sporofit** va **jinsiy nasl** esa **gametofit** deb ataladi. Bu jarayon bilan o'rmonlarda o'suvchi paporotnik (qirqquloq) misolida tanishamiz.



NASLLAR GALLANISHI:

- O'rmon qirqqulog'i ***diplobiont***. Uning ildizi (er usti poyasi) va barglari ***jinssiz nasl*** — ***sporofit*** hisoblanadi, chunki hujayralarning ***yadrolarida diploid*** miqdorda xromosomalar bor.



Dryopteris filix mas

SPORANGIY:

- Barglarining ostida yonlari biroz botiq va juda mayda, dumaloqbandli *sporangiyalari* bo'лади.



- Qirqquloq o'simligining *sporangiyalari*

SPORANGIY:

- Sporangiyolari to'p-to'p joylashganligi sababli ularni **sorus** (yunon. soros — to'p) deb ataladi. Soruslar yupqa parda — **indzium** bilan qoplangan.



SPORANGIYNING HOSIL BO'LISHI:

- **Sporangiy** *sporofill* (yunon. *s p o r a* — urug', *fillon* — barg) larning **meristemasi** (meristes — ajraluvchi) **dan** rivojlanadi va yumaloq shaklda bo'ladi. Uning yuqori hujayrasidan *arxesporiy* to'qimasi hosil bo'ladi. Uning **ichki parda** — **tapetum** hujayralarining bo'linishidan *sporogen* to'qima vujudga keladi. Bu to'qimaning meyoz bo'linishidan *tetraspora* yetiladi.

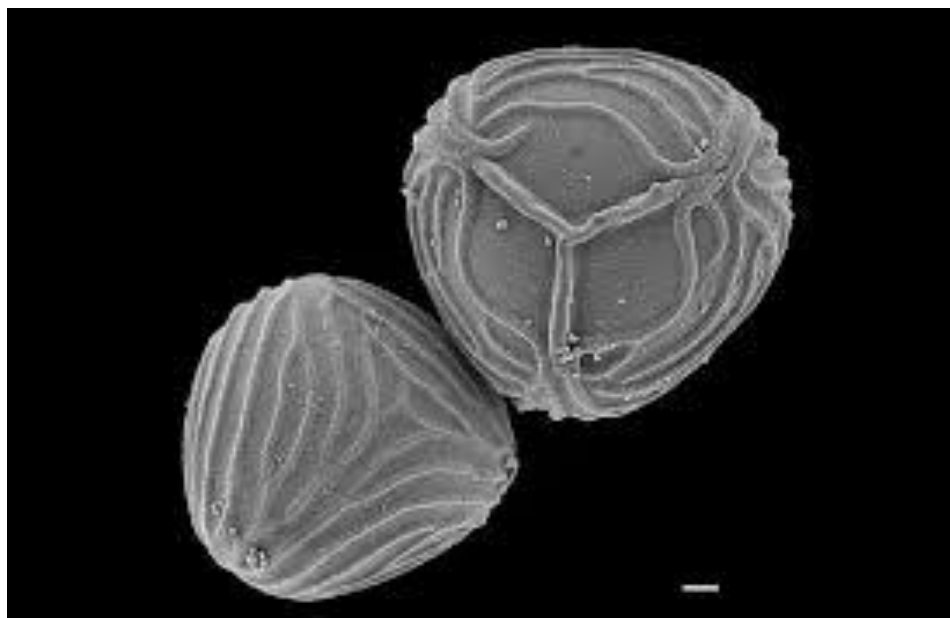
SPORALARNING TARQALISHI:

- ***Sporalar yetilgandan*** so'ng ichki hujayralar yoki va yetilgan sporalar otilib chiqadi. Sporalar ***ikki qavat po'st*** bilan o'ralgan. ***Tashqi qavati*** qalin bo'lib ***ekzina*** deb ataladi. Bu qavat sporani qurib qolishdan saqlaydi. Sporalar shamol yordamida tarqaladi.



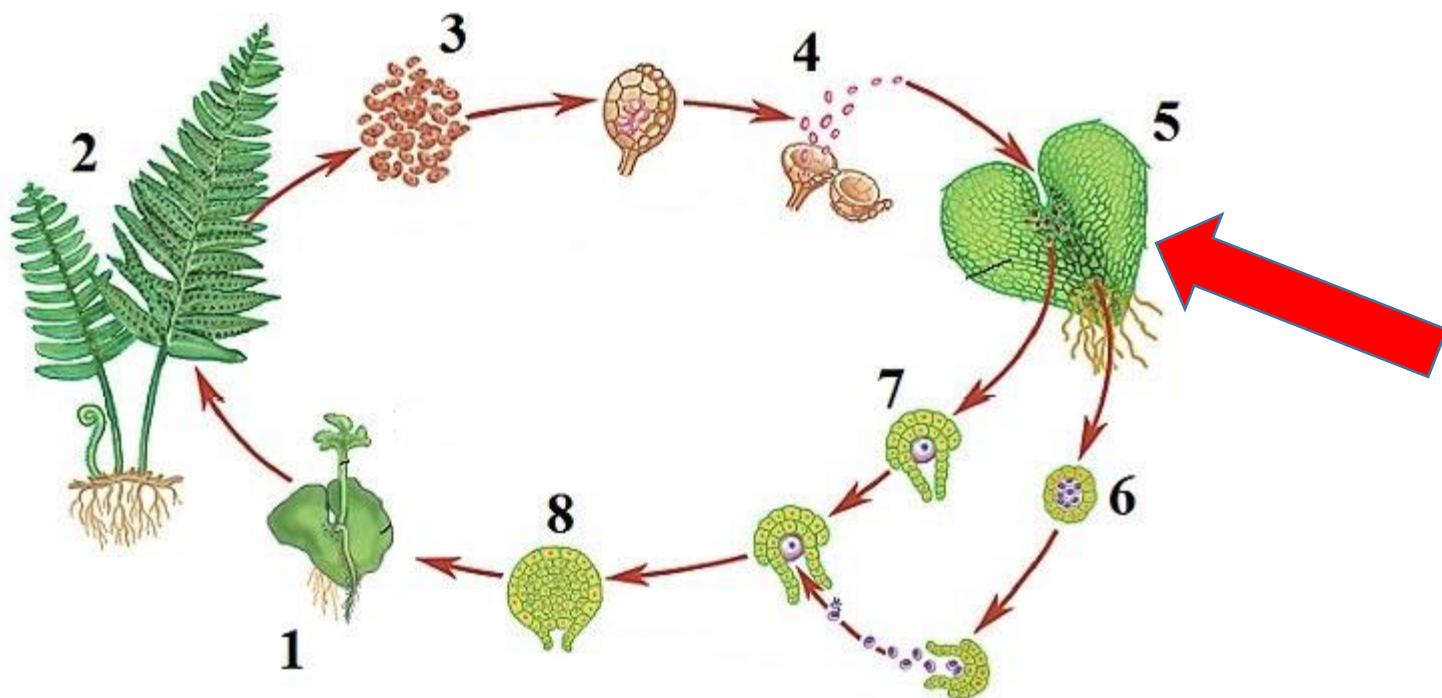
SPORANING AHAMIYATI:

- Demak, meyospora (tetraspora)lar qirqquloqning ko'payishi va tarqalishi uchun xizmat qiladi. Sporalar hosil qiluvchi o'simliklar *sporofit* deb ataladi.
- Spora hosil qilish yo'li bilan ko'payishni — *jinssiz ko'payish* deyiladi.



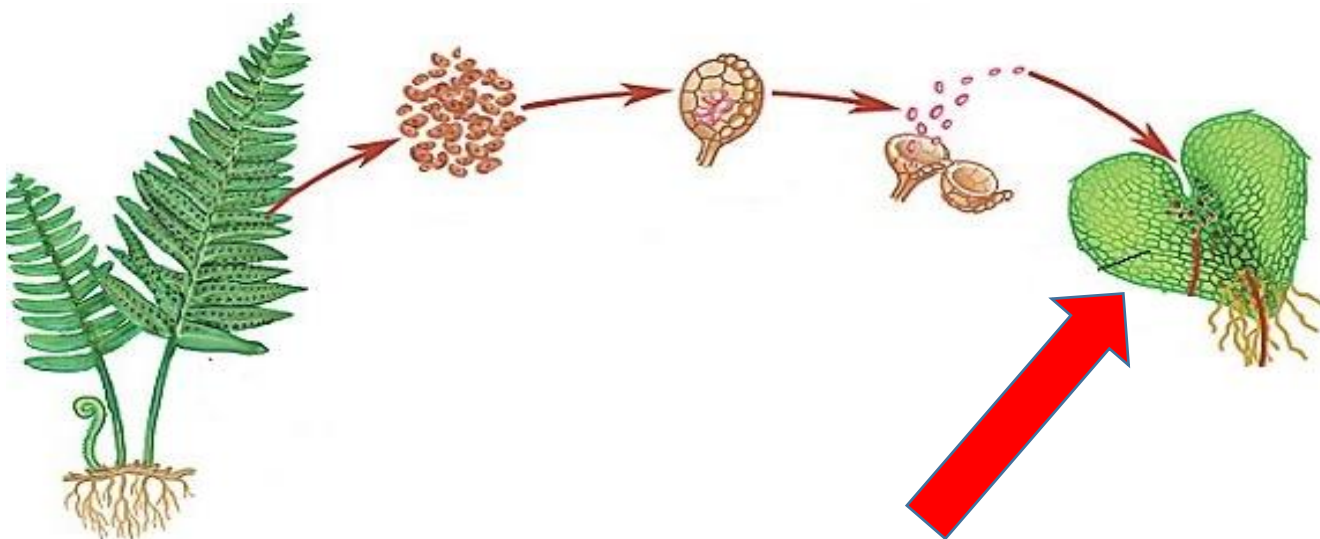
SPORANING RIVOJLANISHI:

- Spora nam yerga tushgandan so'ng, uning gaploid yadrosi mitoz yo'l bilan bo'linib o'sadi va **maysa (o'simta)** hosil qiladi. Maysa hujayralarida xromosomalar **gaploid** sonda, tashqi ko'rinishi jihatidan diplobiond sporofitdan keskin farq qiladi.



O'SIMTANING TUZILISHI:

- Maysa xlorofillga boy, ko'phujayrali, *yuraksimon*, shoxlanmagan shaklda bo'lib, *rizoidlari* yordamida yerga birikib mustaqil o'sadi.



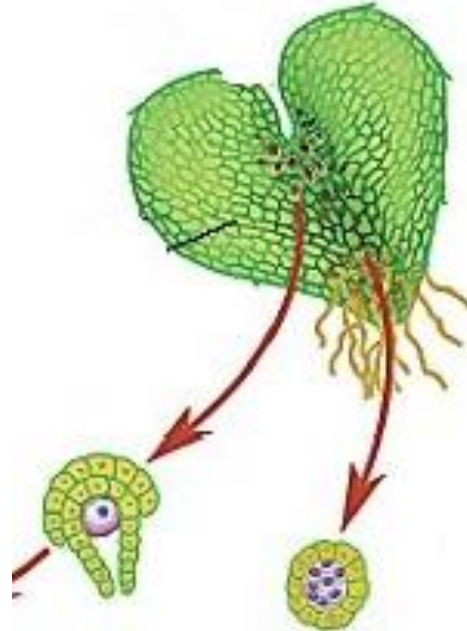
O'SIMTANING RIVOJLANISHI:

- O'simtaning pastki tomonida gametangiy taraqqiy etadi, unda avvalo *anteridiy*, keyin *arxegoniya* hosil bo'ladi.



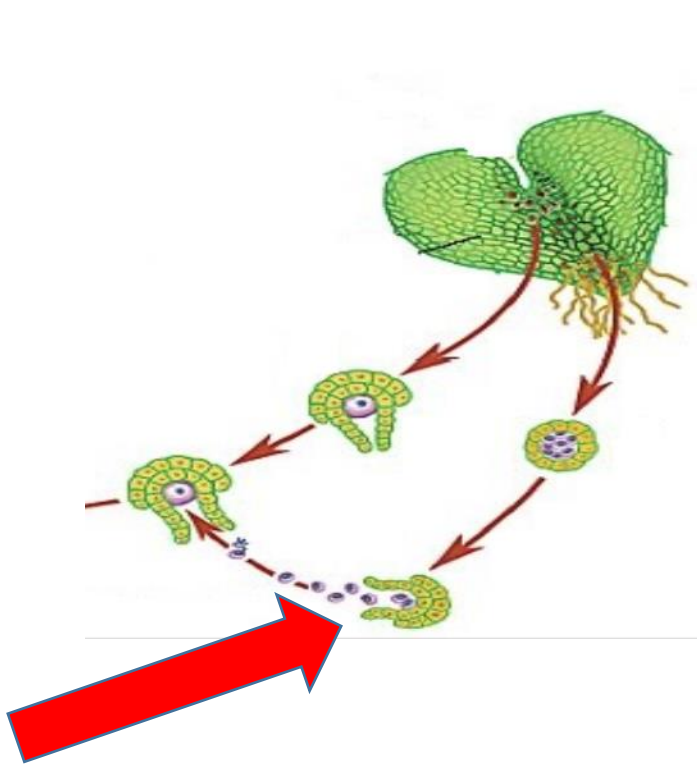
O'SIMTANING RIVOJLANISHI:

- Anteridiy va arxegoniy hujayralar mitoz yo'l bilan bo'linadi. **Anteridiydan** **spermatazoid**, **arxegoniydan** esa **tuxum hujayra** yetiladi. Demak, o'simta qirqquloqning **jinsiy nasli bo'lib, gametofitdir**.



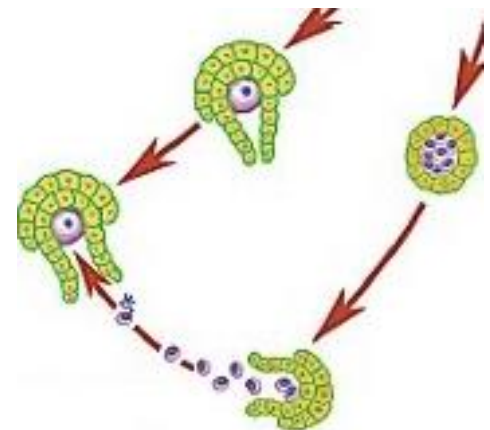
ANTERIDIYNING TUZILISHI:

- Qirqquloqning ***anteridiysi*** dumaloq, devori bir qavat hujayradan iborat. Uning ichida **spermatogen** hujayralari bo'ladi. Spermatogen hujayralardan uchida ***bir tutam xivchinlarga*** ega bo'lgan **spermatazoid** yetiladi va suvda harakat qilib ***arxegoniya***ga tushadi.



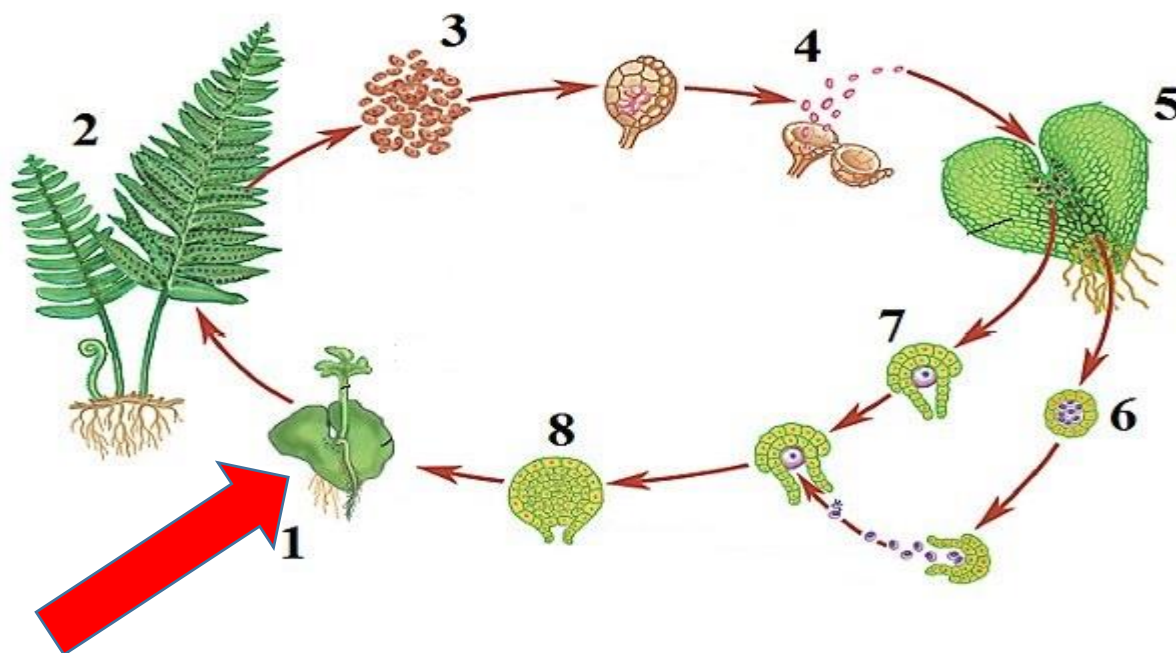
ARXEGONIY:

- **Arxegoniy** shakli kolbaga o'xshash, uning qorin qism o'simtaga botgan, bo'yinchasi tashqariga chiqib turadi. Qorin qismida **tuxum hujayra**, ustida esa kanal hujayrasi bo'yincha bor. Ular bir-biri bilan qo'shilib ketadi. Arxegoniy yetilganda bo'yinchadan **shilimshiq modda** chiqib suvga qo'shiladi va undagi spermatozoidlarni o'ziga jalb etadi.



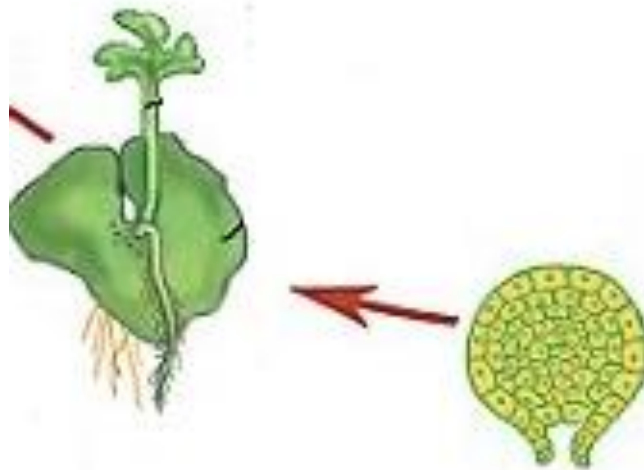
URUG'LANISH:

- Arxegoniy spermatozoidlarni o'ziga jalb etadi. Arxegoniy ichiga kirgan spermatozoidlardan bittasi tuxum hujayra bilan qo'shilib, uni urug'lantiradi. Urug'lanish natijasida hosil bo'lgan diploid **zigota** o'sha zahotiyoq mitoz bo'linib, **sporofit** nasl beruvchi murtak (embrion) takomillashadi.



ZIGOTANING O'SISHI:

- Murtak avvaliga ***o'simta*** hisobidan oziqlanadi, keyinchalik ***ildiz, yer osti poya*** va ***barg*** chiqargandan so'ng o'simta quriydi.



QIRQQULOQNING RIVOJLANISHI:

- Qirqquloqlarda yadro davrlarini almashinishidan tashqari, ularda nasllar ham gallanadi: ya'ni **sporofit jinssiz** ko'payishda ishtirok etuvchi sporalar **diploid** sonli xromosomalardan iborat bo'lib, ularning o'sishidan **jinsiy organlar** (**anteridiy** va **arxegoniya**) gaploid sonli xromosomalarga ega bo'lgan jinsiy nasl gametofiti gallanadi. Biroq, **sporofit** va **gametofit tashqi ko'rinishi** jihatidan bir-biridan keskin farq qiladi.



QIRQQULOQNING RIVOJLANISHI:

- ***Sporofit*** ko'p yillik va tamomila mustaqil ravishda yer ustida o'sadi. ***Gametofit*** esa kichkina differensiyalashmagan tallomdan iborat. U suv sharoitida o'sishga moslashgan, lekin uzoq o'smaydi. ***Sporofit meyosporalar, gametofit*** esa ***gametalar*** vositasida nasl qoldiradi. Nasllarning bunday gallanishiga **geteromorf** (yunon. geteros — har xil; morfe — shakl) **gallanish** deyiladi.

MUSTAQIL TA'LIM TOPSHIRIG'I:

- Moxlar va qirqbo'implarning ko'payishning usullarini.

E'TIBORINGIZ UCHUN
RAHMAT!