Genetics of organisms lab report

Measuring only a few millimeters in length, fruit flies take up a fraction of the room of other organisms such as fish or rats that have also been used in such research. The flies are small enough to be compact, yet large enough to be seen in great detail under a dissecting microscope. Due to their size, cost offoodand space to house them is extremely low, making them easily accessible to schools and laboratories every. Veer. The entire life cycle Of the fruit fly is a mere 30 days, 7-12 days of which are spent maturing. 2-15 hours after eggs are laid, larvae emerge for 4 days to grow and feed on toting fruit (which their eggs were laid on) before undergoing a 4 daymetamorphosisafter which they are adults. The rest of their adult lives are spent eating and mating (Fruit Fly). Females are able to mate as soon as 12-18 hours after the 4 day metamorphosis. Differentiating male and female flies is quite simple; males (left) have sex combs which look like small black dots on their front legs and have fewer dark lines across their abdomen.

Females (right) are typically larger and have dark stripes across the abdomen and have an ovipositor extending from the lower abdomen (Lab Seven). Today, fruit flies are being used in stem cell research of gremlin cells. These highly vital gremlin cells become gametes and carry on the evolution of a species. Researchers at the university of Utah have been studying how germ stem cells protect themselves from becoming somatic cells using fruit flies.

It all began in 1 922 at Massachusetts Institute ofTechnologywhere Ruth Lehmann discovered a gene she named " Oscar". Oscar is responsible for adding a vital protein to the plasma of the germ stem cell that when inactive inhibits the production Of germ cells. When it is turned on, germ cells are

produced and kept as stem cells through " extreme transcriptional repression". During this process, DNA is inhibited from being transcribed to RNA which in turn means no gene expression.

This research is delving into the specifics of stem cells which are suspected to hold treatments for many diseases (Scheduler). While our lab wasn't investigating the mechanics of stem cell development, we studied the inheritance of traits though generations of flies. Our objective was to see the different patterns of inheritance that genes can take. To have exults as close to expected as possible we kept temperature, food and light constant throughout all tests as controls and let the mating and passing of traits be the variable.

Keeping all other factors constant we hypothesized that if cross A showed monophonic inheritance it would have a 1: 2: 1 ratio, dibber crosses would have a 9: 3: 3: 1 ratio and sex linked inheritance would show a ratio of inheritance. Materials Fruit Flies (Drosophila Melanomas) Cross A: Sepia female x Wild male Cross 8: Vestigial female x Sepia male Cross C: White female Wild male Colored tape Petri dishes Fruit fly blue media Flyway Plastic vials (with foam stoppers) Microscopes Paint Brushes Funnels " Morgue" Ice packs Procedure 1.

Obtain a vial of Fl generation flies (either cross A, B, or C and make sure to label the vials as such). The first objective is to remove the flies from the vial without having them fly away. To prevent this, wedge a wand that has been dipped in fly nap between the foam stopper and the vial so that it reaches into the vial to anesthetize the flies. To help immobilizers them, placing the

vials in a cool location or on an ice pack can help to calm them as they are Elian on environmental factors. 2.

After the flies have been anesthetized, remove them from the vials and place them in Petri dishes with labels matching the vials they came from to avoid confusion. To remove the immobilizers flies from the vial, it is important to be gentle and avoid crushing any flies. The majority of the flies should fall from the vial when it is inverted, but to remove any that are left, a paintbrush can be very useful to move them without causing them any harm. 3. Once the flies are in Petri dishes, place them on ice packs to prevent the flies from waking up during counting.

Place the ice pack and Petri dish under a dissecting microscope. With the help of the microscope, record the sex and phenotype of all flies. To maneuver the flies within the Petri dish, use a paint brush to avoid harm. The characteristics of sexing flies is described in the introduction on page 2. 4. Once the flies have been sorted by sex and phenotype, prepare the vials for the PA generation. Mix equal parts dry food and water and let it set in the vial. Make sure to label the vial with the phenotypes of each parent of the cross. . Once the vials are prepared, begin placing in pairs of male and male flies into the correctly labeled vials. Use paint brushes for moving flies if necessary. Cap these vials and place them in a warm area. These flies will mate and produce the IF generation 6. After the IF vials have been sitting for approximately 10-12 days, remove the adult flies. By this time the flies will have mated and the female will have laid her eggs. Removing the adults will prevent Fl flies from mating with IF offspring.

To do this, carefully use Nap (technique as described in step 1), being aware that fly larvae are more sensitive and may be fatally harmed by " over-napping". Remove the flies by inverting the vial and placing the adult Fl flies in the " morgue" (a jar containing alcohol or baby oil). Then close the vial and allow it to sit for another 12-15 days. 7. After 12-15 days have passed, record the sex and phenotype of all adult flies. As described in steps 1-3 Flyway will be used to anesthetize the flies before they are removed from the vials to be put into Petri dishes for counting.

Once all of the flies have been counted and recorded, place them into the " morgue" and dispose Of all vials. Rest Its Fl Results: Cross A -? Wild Male x Sepia Female E - Wild eyes e - Sepia eyes Cross B - Sepia eye normal wing male x Wild eye vestigial wing female beef x Beef Fee Beef Sepia eyes e F - Normal wings f - Vestigial Wings Cross C -? Wild male x White female Exe x EXE Exe Exe e - White eyes IF results: Cross A - Wild male x Wild female Chi-square Analysis Phenotype # Observed # Expected (o-e) (0-e)2 (0-e)2/e Wild eyes 256 260 -4 16 . 615 91 87 4 . 1 83 Chi-square Value . 25 Null Hypothesis: If a monophonic cross is performed between two fruit flies that are both heterozygous for eye color, the expected offspring counts would be in a 3 wild: 1 sepia ratio and would have a chi square value less than 5. 99.