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## Section 1. Biotechnology

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### THE EFFECTS OF CANNABIS ON COGNITIVE FUNCTION IN PATIENTS WITH MULTIPLE SCLEROSIS

**Abstract.** In as much as neuropsychological deficiencies have been widely reported in many random healthy individuals who use street cannabis, data in patients with multiple sclerosis (MS) are not found. Given that MS is associated with cognitive deterioration, the objective of this study, however, was to determine the neuropsychological effects of cannabis use among people especially sufferers of cognitive malfunctions. People who use Cannabis had significantly worse performance on measures of information processing speed, executive functions, and visuospatial perception, and were twice as likely to be categorized as globally cognitively disabled. Similar results were found after controlling for potential confounding variables. This study provides pragmatic analysis that prolonged cannabis use in MS patients is associated with worse performance on cognitive domains commonly affected in this population. The therapeutic benefits patients may derive from using cannabis should be weighed against the associated cognitive side-effects.

**Keywords:** Cannabis, multiple sclerosis.

#### Introduction

Cannabis, also known as marijuana among other names, is a psychoactive drug from the Cannabis plant used primarily for medical or recreational purposes. It is commonly comprised of a group of three plants species with psychoactive properties, known as *Cannabis sativa*, *Cannabis indica*, and *Cannabis ruderalis* (Hall et al. [2]). Some call it weed, some call it pots, and others call it ganja. Its usage by humans dates back at least the third millennium BC in written history (Murray [1]).

It was discovered as a distinct disease by French neurologist Jean-Martin Charcot in year 1868, who formally put it on paper and wrote extensively about the disease

after discovering – plaques and scarring of tissue in the brain of a deceased young woman who had unexplained and treatment-resistant neurological problems (Charcot [3]). Multiple sclerosis is currently recognized as one of the foremost causes of neurological disability affecting young and middle-aged adults who often experience disabling symptoms that considerably restrict their social and occupational functioning and adversely influence their quality of life (Degenhardt et al. [4]).

#### Materials and methods

##### Materials

The main instruments used were High Pressure Liquid Chromatography (HPLC)/ tandem

mass spectrometry (LC/MS/MS MALDI TOF, 2009), Barbiturates (20mg/ml) and Cannabinoids (95 grams) were analysed by Enzyme Immunoassay (EMIT, Syva, Siemens Healthcare Diagnostics).

For the cannabis sample collection, only those who reported smoking or ingesting cannabis in the last 5 weeks, and whose urine tested positive for cannabinoids but no other illicit drugs on the day of assessment were included. Subjects who reported cannabis use less than 12 hours prior to testing were excluded to avoid assessing those who were acutely intoxicated.

For the control (non-user) sample, only patients who reported no history of regular cannabis use and had urine that tested negative for cannabinoids and other illicit drugs were enrolled. A remote history of occasional teenage use was not an exclusionary factor. Non-users were group-matched to cannabis users on age, sex, education, premorbid intelligence, level of disability, as well as disease course and duration.

**Methods:** Two groups, each of 25 patients with multiple sclerosis (cannabis users and nonusers), were administered the Minimal Assessment of

Cognitive Function in Multiple Sclerosis battery of neuropsychological tests, the Hospital Anxiety and Depression Scale (HADS), and the Structured Clinical Interview for the DSM-IV Axis I Disorders (SCID-I). Group-matching and regression analysis were used to control for the effects of age, sex, education, premorbid intelligence, disability, and disease course and duration on cognitive function.

## Results

### Comparison between cannabis users and non users

Comparisons between cannabis users and non users on demographic and disease-related variables are presented in (table 1). There were no statistically significant group differences for age, sex, years of education, marital status, EDSS, disease course, duration of MS, and use of disease-modifying drugs. Cannabis users were significantly more likely to be unemployed. Cannabis users also reported slightly higher alcohol consumption compared to nonusers, although this difference did not reach statistical significance.

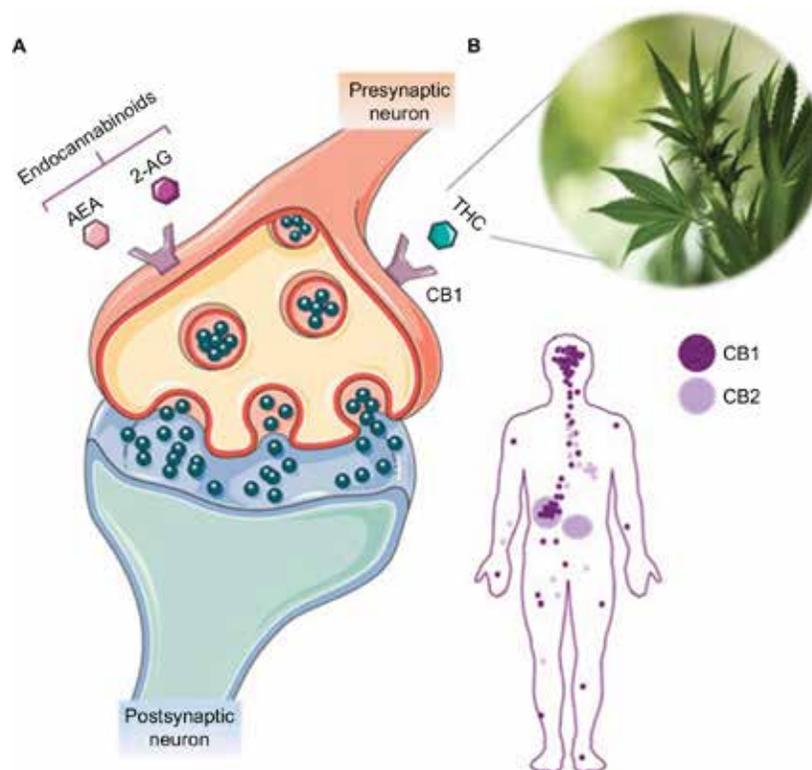


Figure 1. The endocannabinoid system and CB1/CB2 distribution

Due to its abundance in the body, particularly in the nervous system, CB1 and its subsequent psychoactive effects have been extensively studied. As illustrated in (Fig. 1), cannabinoid binding regulates pre-synaptic  $Ca^{++}$  levels generally leading to a reduced release of neurotransmitters. This mechanism plays an essential role in maintaining homeostasis, thereby implicating this system in several physiological and pathological conditions that have been previously reported in detail.

(A) The mechanism of action of the endocannabinoid system is depicted, with human endocannabi-

noids AEA or 2-AG binding to CB1 to initiate a signaling cascade through the release of neurotransmitters. THC is also able to bind to CB1, exerting its effects on the central nervous system and peripheral system. (B) Distribution of CB1 and CB2 in the body. CB1 is concentrated in the central and peripheral nervous systems. CB2 is more abundant in the immune system and, to a lesser degree, in the nervous system

**Abbreviations:** CB1/CB2, cannabinoid receptor 1/cannabinoid receptor 2; AEA, anandamide; 2-AG, 2-arachidonooylglycerol; THC, (-)- $\Delta^9$ -trans-(6aR,10aR)-tetrahydrocannabinol.

Table 1.– Demographic and neurologic variables for multiple sclerosis cannabis users and non-users

Sample characteristics	Cannibis users	Non-users	t or $x^2$	Probability
Age, y, mean (SD)	43.6 (11.7)	43.6 (9.8)	t = 0.000	1.000
F/M	11/14	12/13	$x^2 = 0.081$	0.777
Education, y, mean (SD)	13.5 (2.8)	14.6 (2.8)	t = -1.482	0.145
ANART, mean (SD)	108.6 (9.7)	112.5 (7.1)	t = -1.581	0.120
Employment status, n (%) currently employed	7 (28.0)	14 (56.0)	$x^2 = 4.023$	0.045
Marital status, n (%) married/common-law	16 (64.0)	17 (68.0)	$x^2 = 0.089$	0.765
Disease duration, y, mean (SD)	11.4 (7.6)	12.7(11.0)	t = 0.479	0.634
Relapsing-remitting	17	19	$x^2 = 0.422$	0.810
Primary/secondary progressive	3/5	2/4	-	-1
EDSS, mean (range)	3.0 (0–8.5)	2.0 (0–8.0)	t = 1.186	0.241
Disease-modifying drugs, n (%)	11 (44.0)	9 (36.0)	$x^2 = 0.333$	0.564
Alcohol, n/wk., median (range)	2.5 (0–12)	1.0 (0–8)	t = 1.870	0.068

## Discussion

The specific aim of this prospective study was to examine the effects of smoked or ingested cannabis on cognitive function in patients with multiple sclerosis (Dornbush [9]). It was found that cannabis users had greater deficits on information processing speed, working memory, executive function, and visuospatial perception compared to a sample of nonusers group matched on age, sex, education, premorbid intelligence, EDSS, and disease course (Dean et al. [8]). Cannabis users were also twice as likely as nonusers to meet criteria for global cognitive impairment. Most of these between-group differences were retained after controlling for potential

confounds. Cognitive dysfunction affects approximately 40%–60% of patients with Multiple sclerosis with detrimental effects on personal, social, and occupational functioning. Cognitive functioning is also a major determinant of quality of life

(Culver et al. [7]). Given these adverse psychosocial effects, identifying risk factors associated with further cognitive impairment is important.

Although not the focus of the present investigation, it is plausible that the additional cognitive deficits associated with chronic cannabis use have deleterious psychosocial ramifications. For example, our study found that cannabis users were twice as likely to be unemployed than nonusers. While the

reasons for this are not clear, an association between impaired cognitive performance and unemployment in patients with multiple sclerosis has been reported, thereby suggesting a putative link with this research cannabis findings (Easton et al. [6]). To date, the clinical trials literature on the effects of cannabis on cognition in patients with multiple sclerosis is sparse, largely limited to synthetic cannabis derivatives or cannabis-based extracts, with measures of cognition confined to secondary analysis. Results are equivocal, with deficits in long-term memory storage reported by one study contrasting with an absence of deleterious cognitive problems associated with cannabinoids reported by others (El-Gohary et al. [5]).

### **Conclusions**

This cross-sectional study provides empirical evidence that prolonged use of inhaled or ingested

street cannabis in patients with multiple sclerosis is associated with poorer performance on cognitive domains commonly affected in this population. Whatever subjective benefits patients may derive from using street cannabis (e.g., pain and spasticity relief) should be weighed against the associated cognitive side effects.

In the light of high prevalence and adverse consequences of cognitive dysfunction in patients with multiple sclerosis, it is plausible that the further cognitive burden introduced by chronic cannabis use may interfere with social, personal, and occupational functioning of patients. Given the high prevalence of cannabis use in this population, further research is needed to replicate these findings and to explore the cerebral underpinnings of cognitive dysfunction associated with cannabis use in patients with multiple sclerosis.

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## FED-BATCH FERMENTATION FOR BIOETHANOL PRODUCTION

**Abstract.** This Fed-batch fermentation method is aimed at efficiently carrying out fermentation of *Candida krusei* in the production of bioethanol, characterized by a low concentration of components in the initial medium to minimize metabolic regulation. At the time of inoculation the medium promotes initial growth of microbes; subsequent supplies of more raw materials drive the desirable increase in metabolite biosynthesis. Actual product cost depends on the cost of the carbon source or specific precursors that are used for feeding. The nitrogen source is supplied generally through pH control with ammonia. This process is of particular importance in industrial operations where the reaction of the microbial catalyst does not last long; hence, continuous fermentation cannot be practiced. Analysis on the growth behavior of the yeast *Candida krusei* cultivated in a medium composed of yeast extract glucose and wood juice was carried out. Major parameters analyzed were Dry Mass, Optical Density (OD600) Glucose and Ethanol.

**Keywords:** Fed-batch fermentation, Glucose, Ethanol, Optical Density, Dry Mass.

### Introduction

Fed-batch fermentation is a process where all the substrate and nutrients are added at zero time or soon after inoculation takes place, and the vessel is allowed under a controlled environment to proceed until maximum end product concentration is achieved [2]. More than 84% of all alcohol in North America is made by batch fermentation – mainly due to the flexibility in a batch plant, the higher product concentrations possible, the ability of industry to minimize infection/loss of yield, the ease of the practice, and low maintenance costs [1]. It is a commonly used process in industrial applications as it offers a number of advantages as compared to other processes like batch and continuous cultivation. Prominent biological phases such as lag and stationary phases are often prolonged upon periodic addition of substrate in the fermenter which results in rapid increase

in biomass [4]. Fed-batch is characterized by processes where one or more nutrients (substrates) are fed (supplied) to the bioreactor during cultivation and in which the product remains in the bioreactor until the end of the experiment [3]. Various types of bioprocess features for which Fed-batch culture is effective include substrate inhibition, crab tree effect (glucose interference), catabolite repression etc.

### Procedure

#### 1. Preculture Medium (120 mL × 4 = 480 mL)

- 440 mL of medium consisting of only wood juice & yeast extract was prepared;
- A 12% glucose stock (6 g of glucose in 50 mL) was prepared to be autoclaved separately to avoid Maillard reaction;
- 40 mL of this glucose sol. was added to 440 mL of previously mentioned medium to a final volume of 480 mL;

- 4 shaking flasks with a volume of 120 mL each were aliquoted from 480 mL of medium;
- Only one flask was used for inoculation. Another was to be used for OD600/Dry Mass Correlation;
- Remaining two were prepared as backup.

Table 1.– Fermenter Batch Medium (1200 mL)

Components	Composition
Yeast extract	75 g/L (90 g in 1200 mL)
Wood Juice	80% v/v
Tap water	20% v/v
Inoculum (post sterilization)	120 mL

- 120 mL of inoculum was added to the fermenter containing batch medium after the fermenter had been autoclaved with the medium inside

Table 2.– Fermenter Feed Medium (600 mL)

Components	Composition
Glucose	75 g/L (90 g in 1200 mL)
Wood Juice	80% v/v
Tap water	20% v/v

#### 4. Autoclaving Media

All the media except batch medium was autoclaved to ensure sterility.

#### 5. Inoculum Preparation

Inoculum was prepared by transferring a single colony from the pure yeast strain into 120 mL of pre-culture medium inside a 300 mL flask. The flask was placed on a shaker inside an incubator at 30 °C for overnight cultivation.

#### 6. Reactor Assembly, Adding Batch Medium & Autoclaving

The fermenter used in this experiment was “Biostat B”, manufactured by Sartorius Stedim Biotech. The various components of the fermenter, i.e. the double jacket glass reactor, the PCU, and a multitude of other probes & elements (such as filters, sealants, tubing etc) essential for smooth operation were carefully assembled. After the reactor was assembled, batch medium was added inside, and it was autoclaved overnight.

#### Methodologies

Collected samples throughout the length of the fermentation process were analyzed for OD600 & glucose concentration. Ethanol concentration was also analyzed. Various variables, such as  $Q_{CO_2}$ ,  $Q_{O_2}$ ,  $q_{CO_2}$ ,  $q_{O_2}$ ,  $RQ$ ,  $\ln(x)$ , and  $\mu$ , were calculated for parametric comparisons. Detailed below are the procedures and results in graphical form for the different analyses performed.

#### 1. Sample Collection

Samples from the bioreactor were collected into falcon tubes using a disposable syringe.

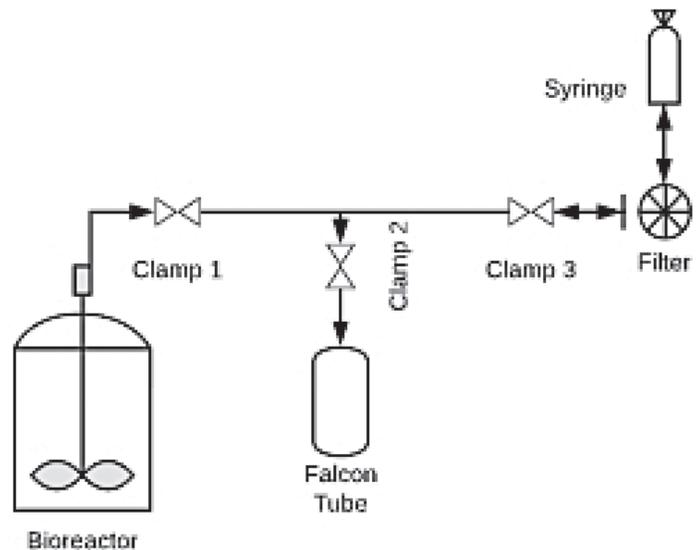


Figure 1. Bioreactor setup

The following method was employed:

- All the clamps were tightened around the tubing during fermentation;
- For sampling, Clamps 1 & 3 were loosened;
- A disposable syringe attached to a filter was used to create a vacuum to such fluid out of the bioreactor. Caution was employed as to not wet the filter.
- Clamp 1 was tightened & Clamp 2 was loosened;
- The syringe was used to push out the fluid inside the tubing into the falcon tube;
- Clamp 2 was tightened & Clamp 1 was loosened again to push excess fluid back into the bioreactor;
- At the end, all clamps were tightened, and the open end of the sampling tube was submerged into 80% ethanol.

## 2. Optical Density (OD600)

Optical density measurement is very important in fermentation processes as it is an indirect method of measuring the biomass concentration. The underlying principle is the correlation between the number

of cells in a biological sample and the absorbance of the sample at a wavelength of 600 nm. The common rules and guidelines of operating a spectrophotometer were used. For accurate measurement results, the absorption values were ensured to stay between 0.0–0.3 and were measured in duplicates. Therefore, any sample with an absorption value > 0.3 was suitably diluted in H<sub>2</sub>O. To minimize the measuring error caused by contaminants in cultivation medium and the medium itself, OD of the medium was subtracted from the OD of samples.

$$OD_{600} = [\{(OD_1 + OD_2)/2\} * DF] - OD_{medium}$$

### 2.1 Result (Theoretical vs Experiment):

The expectation for this analysis was that the widely observed trend of yeast growth in a fed-batch fermentation would be observed. That is, a lag phase followed by exponential growth, followed by steady-state growth. The experiment appears to follow a similar trend, but after ~3 hours of feed rate being increased to 60 mL/h, the OD starts to drop.

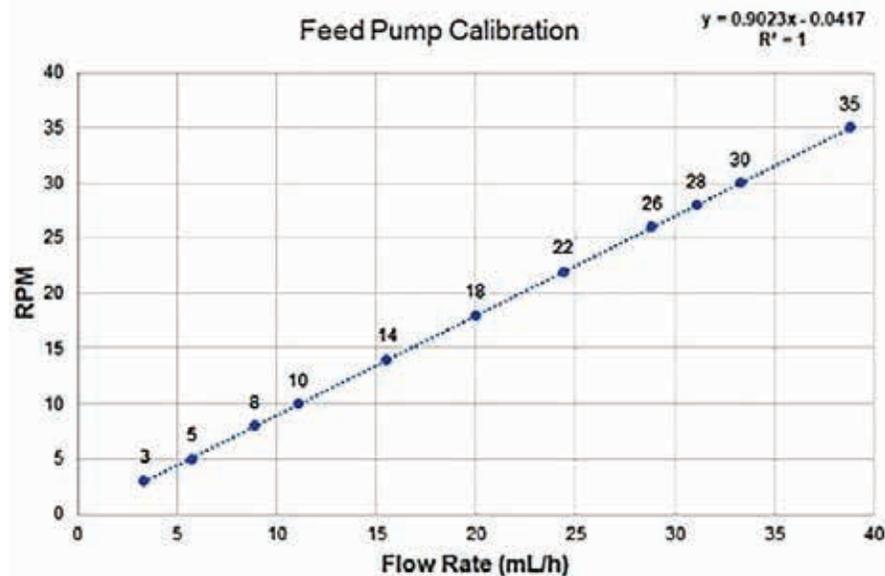


Figure 2. Feed pump calibration overflow rate

## 3. Dry Mass Determination

For creating a process model of the continuous fermentation, a dry mass determination has to be performed. Therefore, a sufficient volume of a homogenous sample was to be dried and weighed. For minimizing the measuring error three samples with

a high biomass concentration from the steady state condition were to be analyzed using the Dry Mass Weight of Kern & Sons, DBS60–3 by following the instruction manual. From the same samples the optical density according to the method mentioned above was to be determined to get the correlation

factor for calculating the dry mass content by a given value of the  $OD_{600}$ .

### 3.1 Result (Theoretical vs Experiment):

Regrettably, this analysis yielded no meaningful results. This was in part due to inconsistent application of method & also because of the presence of physical contaminants from wood juice in samples.

### 4. Glucose Concentration Measurement by DNS

The 3,5-dinitrosalicylic acid is an orange chemical, which is used especially in food chemistry and biotechnology for the detection of sugars with a reducing end (such as glucose). The 3,5-dinitrosalicylic acid reacts with glucose. Glucose is oxidized to gluconic acid and reduces the 3,5-dinitrosalicylic

acid to 3-amino-5-nitrosalicylic acid resulting in a visible color change from yellow orange to red brown that can be measured at a wavelength of 540 nm. The measured values are linear in the absorbance range of 0.0–0.3. Therefore, dilutions have to be made for samples with absorbance > 0.3. Following procedure was employed:

A standard glucose calibration curve was prepared. Absorbances measured using DNS protocol were used to estimate glucose concentration from the calibration curve.

### 4.1 Result (Theoretical vs Experiment):

Results are discussed alongside other parameters at the end.

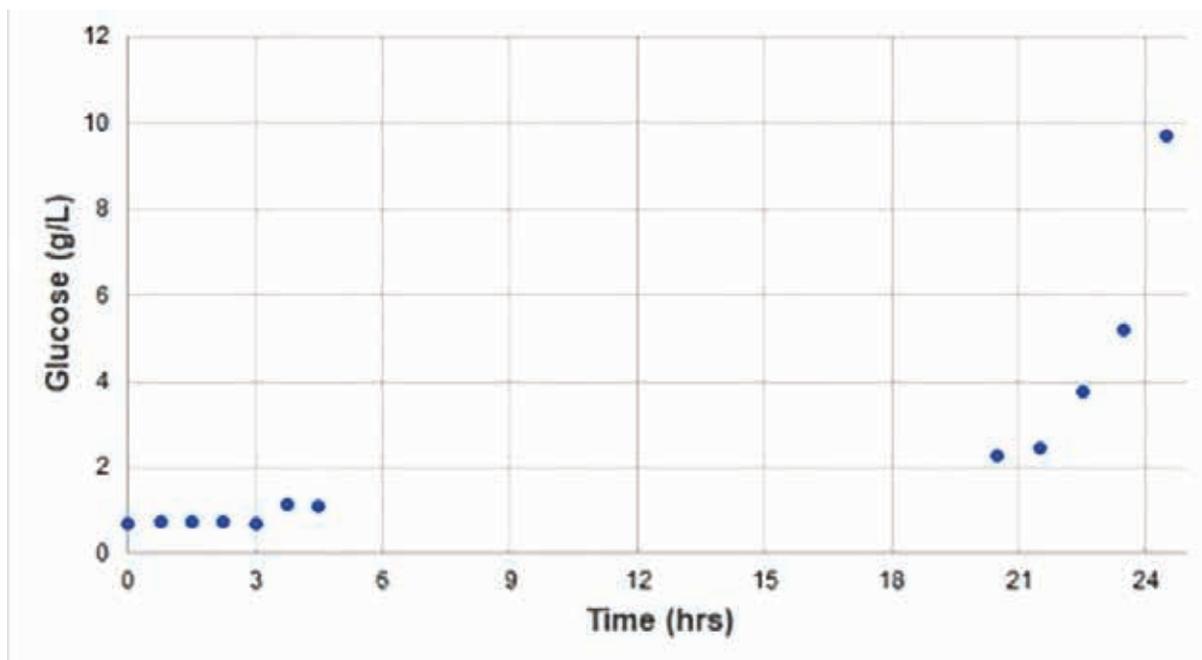


Figure 3. Glucose concentration over time

### 5. Ethanol Concentration

Ethanol concentration was estimated using the Megazyme Ethanol Kit and the protocol included within, which is mentioned below. The order of addition of reagents during the assay removes any possible interference from aldehydes and ketones. The smallest differentiating absorbance for the assay is 0.005 AU. This corresponds to 0.023 mg/L of sample solution at the maximum sample volume of 1.0 mL. The detection limit is 0.093 mg/L. The assay is linear

over the range of 0.25 to 12  $\mu$ g of ethanol per assay. In duplicate determinations using one sample solution, an absorbance difference of 0.005 to 0.010 may occur. If the sample is diluted during sample preparation, the result is multiplied by the dilution factor, F. It is necessary to cover the cuvettes during assay.

### 5.1 Result (Theoretical vs Experimental):

It was expected that the ethanol concentration would gradually increase with time. There was an increased production of ethanol at the 5th hour

(which means the organism was going through crab tree effect) and after that the reactor was kept overnight without any supervision and then there was a significant decrease in the ethanol concentration

which may be due to the anaerobic conditions and there wasn't enough glucose concentration in the reactor due to the increasing density of the cells.

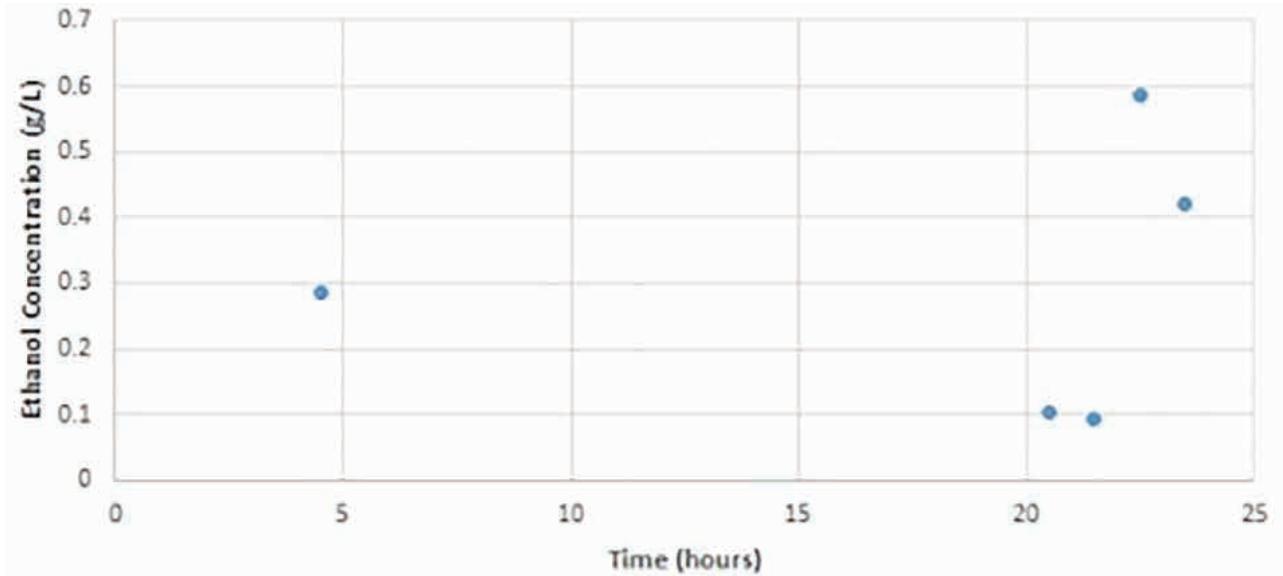


Figure 4. Ethanol concentration with time change

Or it could be the fact that a considerable amount of liquid spilled overnight and the decrease in ethanol could be the direct result of that. When the Feed rate of the Input air was increased the ethanol concentration increased again in accordance with

our expectations. The theoretical yield of ethanol was found to be unclear as it changes with different strains of yeast including recombinant ones.

#### Discussion

Figure 5. Glucose concentration vs OD over Time

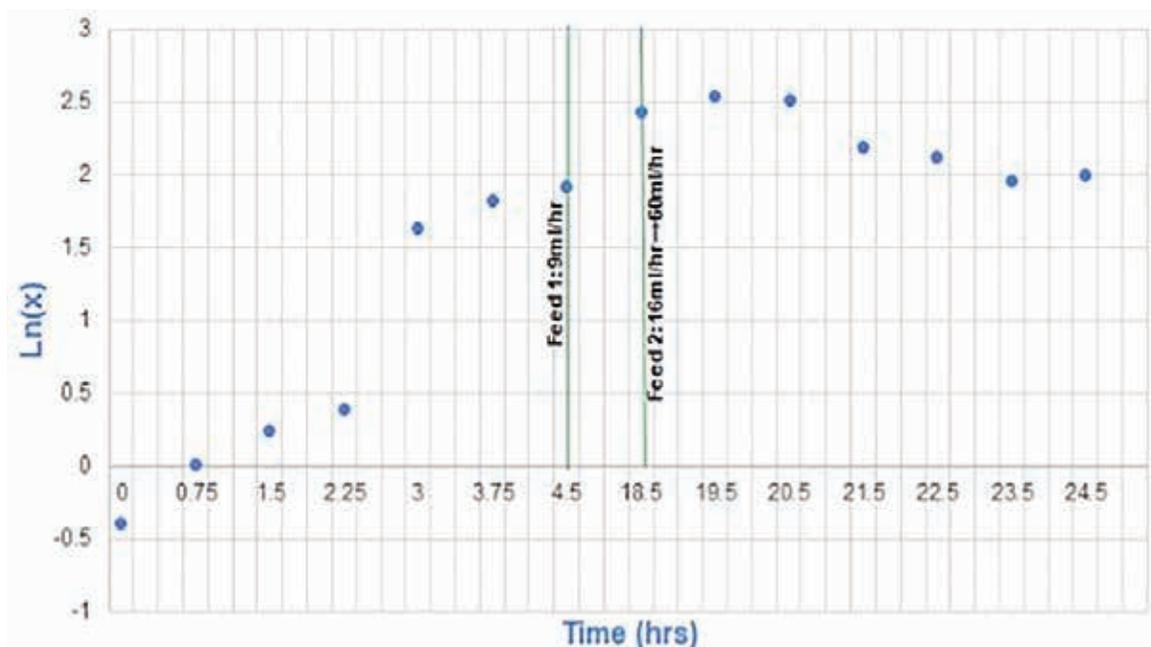


Figure 5. Ln(x) vs Time

These graphs mainly aim at depicting the growth of the yeast at different intervals of time and its relation to the glucose concentration. The expectation for this graph was that it should follow the regular growth of a yeast beginning with its lag phase, followed the log phase, stationary phase, and death phase. This graph ultimately gives us information about how the organism feels at a given point of time and conditions.

In this case there was a slow and steady increase of the  $\ln x$  values till the 3-hour point, but after that there was a sudden increase because of the foaming and the subsequent addition of the anti-foaming agent. This also arises the probability of another situation in which the rapeseed oil added to the reactor can be metabolized by the organism itself. Then there was a break overnight where the reactor was allowed to run in automatic mode, but unfortunately everything didn't go well during that period as there agitation was more than required and there was heavy foaming leading to the clogging of the  $\text{CO}_2$  outlets. The work was resumed the next day again manually and as expected there was an increase in the growth but there was a decrease in growth immediately after that this was because we had increased the rate of the glucose feed pumped in, which might have forced the organism to produce ethanol through crab tree effect as there was excess glucose and the conditions were anaerobic. The  $\text{O}_2$  and  $\text{CO}_2$  correlation is explained in detail in the following graphs and discussion.

Figure 7.  $\text{O}_2$  consumption and  $\text{CO}_2$  production and glucose concentration over Time The above diagram is mainly intended to show the oxygen and carbon-dioxide consumption and production and its correlation with glucose concentration. It was expected that there would be an increase in oxygen consumption rate and  $\text{CO}_2$  production as the time prolongs, consequently causing significant decrease in concentration of glucose because the organism would grow at high densities in the reactor.

Actual result shows that initially when the organism is in lag phase, it takes some time to get adjusted

to the conditions at which the glucose concentrations remain to be same since the mode of operation was "batch". After the fed-batch operation was started, increase in glucose concentration gave a shift rise in oxygen consumption and  $\text{CO}_2$  production. This shows that the organism is growing overnight oxygen consumption drastically decreased from 20% to 1% due to the mishap that occurred overnight this can be overcome by injecting pure oxygen (in accordance with Henry's law).

### Conclusion

This fermentation experiment which was aimed at the production of bioethanol from *Candida krusei* had its fair share of technical challenges. However, the take back from this process of fermentation was really valuable and overall, it was an enriching experience.

The most significant information inferred was the organism used in this experiment is positive to Crab tree effect because there was an increase in ethanol concentration when glucose concentration increases. The most significant information inferred was the organism used in this experiment is positive to Crab tree effect because there was an increase in ethanol concentration when glucose concentration increases. Here are some of the major challenges faced during fermentation and some solution or suggestion of how they can be overcome:

- Standardizing the procedure of OD and Dry Mass Calculation to get more homogenous results;
- Controlling the foaming of the reactor in the reactor and better choice of anti-foaming agent;
- Preventing unexpected spillages from the reactor due to the clogging of the Air outlet which lead to buildup of pressure in the reactor by controlling the RPM and rate of aeration carefully;
- Pumping in pure oxygen to dissolve it better and to maintain the oxygen consumption rate (Henry's Law);
- Avoiding manual error during the analysis;
- Overnight supervision of the bioreactor and to avoid Night Mode if possible.

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## Section 2. History and archaeology

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### RELIGIOUS WAR IN FORM, COMMERCIAL WAR IN ESSENCE: THE CRUSADE

**Abstract.** The first three Crusades greatly helped the Byzantine Empire. In particular, the First Crusade saved the Byzantine Empire on the verge of subjugation and drove the Seljuk Turks back hundreds of miles from the border of Asia. The Crusaders recovered a large area of land such as Nicaea for the Byzantine Empire. After that, Byzantine recovered large areas of land such as Lydia, Messia, Galatia and Northern Phrygia. Europe had entered a dark period because of the collapse of the Western Roman Empire. The Crusades brought back a large number of progressive Eastern cultural ideas, which led to the release of a large number of serfs who became free people. It accelerated the development of craft production and commerce in Western Europe. It was also an important promotion of the Renaissance and modern middle-class commercial civilization. The Crusades laid a strong foundation for modern Europe.

**Keywords:** Religious War, Europe, Commercial War, Crusade.

The first three Crusades greatly helped the Byzantine Empire. In particular, the First Crusade saved the Byzantine Empire on the verge of subjugation and drove the Seljuk Turks back hundreds of miles from the border of Asia. The Crusaders recovered a large area of land such as Nicaea for the Byzantine Empire. After that, Byzantine recovered large areas of land such as Lydia, Messia, Galatia and Northern Phrygia (Day [5]). But the Byzantine Empire betrayed the Crusaders in the battle of Antioch, Anatolian Greek nobles cooperated with each other, and the misdeeds of the rulers of Cyprus intensified the conflicts between the Crusaders and the Byzantine Empire.

The Crusade was a religious war in form, but a commercial war in essence. It gradually changed the world pattern at that time, had a significant and pro-

found impact on Western Europe in terms of economy, politics, culture and life, and laid a material and spiritual foundation for the start of Western Europe's modernization.

The Third Crusade (1189–1192) was led by Frederick I, emperor of the Holy Roman Empire, Augustus Philip II of France and Richard I of England (Asbridge [1]). Frederick led his troops through Byzantium on the land route of the last expedition. The French and the British advanced to Palestine by sea and occupied Sicily on the way. Although the Crusades were full of internal contradictions, the success of the Crusade made the Crusade countries in the Middle East continue to exist for more than a century. The German Crusaders defeated the Roma Sultanate in the battle of Konya and overthrew Asia

Minor. After occupying the port of Accra, Philip led some Crusaders back to France in 1191, leaving some soldiers. Richard defeated Saladin several times and captured all the Muslim towns along the Palestinian coast. However, due to domestic changes, Richard signed a peace treaty with Saladin in 1192. According to the treaty, the rich coastal areas from Tyre to Jaffa belong to the kingdom of Jerusalem. Jerusalem remains in the hands of Muslims, but Christians can go on pilgrimages and are allowed to preach.

The Crusade lasted for nearly 200 years. The Vatican's attempt to establish a world church was not only completely defeated, but also failed for various reasons in order to recover the land invaded by the Arabs and Turks, which greatly reduced the prestige of the church. Later historians commented: "in a sense, it is worse than failure" (Hodgman [6]). But the Crusaders had always maintained a military advantage over Muslims. Charles Aumann believes that because of the excellent cavalry and infantry tactics of the Crusaders, Turks learned to mix step and ride. The Crusaders were known as "iron men (Munro [7])". Turkic tactics proved limited to the Crusaders. For Muslims in Syria and Egypt, hundreds of Crusaders are often unstoppable. And Muslims often use the scorched earth tactics to deal with the Crusaders (Blaydes & Paik [2]). At the same time, Muslim scholars demanded that the army should not fight against the Crusaders unless they had to. The Crusaders' strong performance against Muslims on the battlefield is thought to be very similar to that of later British colonists in India. Since the 12<sup>th</sup> century, about after the First Crusade, literary poetry in the form of memoirs and songs flourished. The development and spread of Crusader epic are called "the Renaissance of the 12<sup>th</sup> century" by some scholars (David [4]).

Many people simply did not return to Europe, especially those who did not have the opportunity to inherit land in Europe, who were not the eldest sons. Those who remained set up military, cultural and commercial outposts in the holy land. The fortresses they established after the first eastern expedition

were often the transplants of European feudalism. The Crusades won a brilliant victory. It had a profound impact: for the superior Muslim civilization at that time, the eastern expedition and the destruction it caused had hit the Islamic world and shaken the confidence of Muslims (Blaydes & Paik [2]); for Europe, the Crusade was a starting point, which pushed Europe towards an open modern world. The recruitment of Crusaders aroused a warm response from European knights, on the one hand out of their own fierce faith, on the other hand, the pope also promised that as long as he died in the Holy War he would be rewarded by heaven. Another incentive is the recovery of land seized by the Arab invasion.

For centuries, pilgrimage to the holy land has been the most common activity for Christians in Europe. Although the major religious centers are in Europe, many of the important holy places are in Palestine. The rise of Seljuk Turks made travel to Jerusalem and other Middle East regions more dangerous. The Turks were not good for Non-Muslims and ended what was called a peaceful relationship between Muslims and Christians. At the same time, the Turks occupied valuable land in Asia Minor, which put great pressure on Byzantine (Brand [3]). In 1095, in response to a request for help from the Byzantine emperor, Pope Urban II called on a crusade of Christian fighters to recapture Palestine from Muslims (Day [5]). By 1097, an army of 30,000 pilgrims and believers crossed from Constantinople to Asia Minor (Munro [7]). Despite the constant fighting between the leaders and the breakdown of the promise between the Crusaders and Byzantine supporters, the March continued to falter (Brand [3]). In the process, the Turks were badly hit. The endurance and physical strength of the Franks allowed them to win a series of victorious battles. Antioch was occupied in 1098 and Jerusalem was recovered in 1099 (Blaydes & Paik [2]). Although many Crusaders returned home after the war, there were also a number of powerful groups left to establish feudal kingdoms similar to those in Europe.

The Fourth Crusade's aim was to capture the Muslim controlled Egypt as a base for future operations. The Crusaders were mainly composed of French and Italian nobles. When they did not have enough money to pay Venetians to cross the sea to Egypt, the Crusaders turned to attack Zara, which betrayed Venice. The angry Pope announced that the Crusader had been excommunicated. At the request of Byzantine royal family Angus, the Crusaders turned to Constantinople (Brand [3]). But the Byzantine Empire was destroyed because Angus broke the contract. After the war, Venice occupied three eighth of the Byzantine Empire. The Crusaders set up the Latin Empire with Constantinople as the center and two Latin Empire States attached to Constantinople, namely the Principality of Athens and the Duchy of Achaia. The Fourth Crusade provided conditions for the reorganization and structure of political forces in the eastern Mediterranean region. It made the seemingly brilliant Byzantine Empire collapse in an instant. It facilitated the power of the Italian maritime Republic to go deep and control the region. It also objectively provided conditions for the rise of Ottoman Turkey, which later influenced western Asia and Europe.

The Crusade began in 1096 and ended in 1291 and carried out eight times (Hodgman [6]). The Crusade had a profound impact on the historical process. To the people of the East, the Crusade was undoubtedly a catastrophe. It destroyed the productive forces, destroyed the culture, plundered many cities and villages, cut off the precious lives of countless people, and seriously hindered the social development of countries in the Near East. At the same time, it also made the vast number of working people in Europe suffer great sacrifice, and thousands of people died (Day [5]). The Crusade broke the monopoly position of Byzantine and Arab merchants in the Eastern trade. Western European merchants, especially some cities in northern Italy and Western Mediterranean (such as Venice, Genoa, Marseilles, Barcelona, etc.) (Willoughby [9]), gained the com-

mercial hegemony of the Mediterranean. The Crusades had a certain impact on the social and political life of Western Europe. Some feudal lords consumed their strength due to death or failure in the eastern expedition, but the city developed rapidly under the stimulation of trade growth, which improved the status of urban citizens, and led to the emergence of hierarchical parliamentary monarchy. With the support of urban citizens, the monarchy was strengthened day by day, which created conditions for the elimination of feudal separatism and the realization of political unity in Western Europe. The failure of the Crusade greatly reduced the prestige of the church and the power of the Pope declined.

Economically, the Crusaders brought the monetary system of the Eastern Roman Empire and Arab business concepts (such as cheques, letters of credit, and joint-stock companies) back to Western Europe, paving the way for the development of capitalism in Europe in the future (David [4]). If there were no Crusaders, maybe there would be no Western civilization today, and our world would be very different. In the early Middle Ages, the decline of commodity economy in Western Europe is a common phenomenon, but not absolute (Brand [3]). In the West European continent, commerce almost did not exist. "Italy, due to its special geographical location and environment, never stopped commercial activities. Commercial cities in northern Italy, especially Venice, were enthusiastic about the Crusades, not mainly for religious reasons (David [4]). They saw it as another step towards economic penetration into the Mediterranean world. They hope to obtain seaports in the eastern Mediterranean Sea, so as to compete effectively with Arab businessmen. Due to the rise of Arab Empire and the restriction of Byzantine Empire, the activities of Italian merchants were greatly restricted. The Crusades broke this restriction and provided a broader market for Italian merchants. "One of the most important consequences of the Crusade movement was that Byzantine and Arab trade in the eastern Mediterranean was greatly

weakened, and the role of European businessmen in this regard was increasingly strengthened, making trade between Western Europe and the east quite frequent” (Willoughby [9]). The Crusade opened up the Mediterranean Sea route, so that Italy’s commercial activities expanded to the eastern coast of the Mediterranean and the vast areas of the Middle East, thus stimulating the development of Italian commodity economy (Day [3]). At the same time, due to the development of commodity economy, commercial network was formed in the interior of Western Europe in the 12<sup>th</sup> century, which led to the death of the whole Western Europe and the comprehensive revival of Commerce.

In the early and Middle Ages, Europe basically had the concept of territory, not the concept of nation-state. With the establishment of hereditary territorial system, in order to prevent the division of territory, most Western European countries have implemented the system of eldest son succession (Day [3]). The younger sons below the eldest son could not inherit the territory and became landless knights and nobles. They were idle and unruly all day long. Many people lived a parasitic life by robberies such as blocking roads and robbing houses. In addition, with the rise of cities and the development of commodity currency economy, the feudal lords in Western Europe demanded more and more commodities and money, Only relying on the original fixed rent collection cannot maintain their luxurious material pursuit, and even some feudal lords have been unable to make ends meet and are heavily in debt (Blaydes & Paik [2]). Therefore, they all took an active part in the eastern expedition, eager to open up a new road of wealth in the East and seize the land and wealth of the East. Thus, in the process of the eastern expedition, the warlike knights and the great lords who dream of independence hastily prepare for the eastern expedition and continue to go to the East. Therefore, in this period, the Western European countries carried out activities to strengthen the monarchy with the support of middle and small

nobles and urban citizens (Leson [8]), the most typical of which were Britain and France. By the end of the 15<sup>th</sup> century, Britain and France had formed a unified kingdom.

During the Crusades, the backward people of Western Europe contacted and absorbed the more developed eastern Roman Empire’s culture and Arab culture. The medieval history of Western Europe began with the barbarians conquering the Western Roman Empire. The Roman civilization that was based on the Greek civilization was also annihilated in the dust raised by the iron hooves of the Germanic people (Willoughby [9]). At this time, in the Islamic world, ancient Greek civilization was preserved and developed. After the European invasion of the East, they found the remains of ancient Greek culture, which had disappeared in Europe but still existed there. After the Europeans brought them back, they were translated from Arabic into Latin. The translation work brought back Euclid’s mathematics, Ptolemy’s astronomy, Hippocrates’ and Galen’s medicine, Aristotle’s physics, logic and ethics to their original home (Day [5]). With the return of ancient Greek culture, Western European people gained new knowledge. Natural science had been paid more and more attention, and various kinds of knowledge increased rapidly. This eventually led to the emergence of the Renaissance (Leson [8]). Though they were far behind the pagan population they were trying to subjugate, the Crusader rulers in Palestine maintained control of Muslims by building castles and adopting a policy of tolerance. However, Frankish culture and religion won the favor of the residents of the areas.

The Crusade, which lasted 200 years (Blaydes & Paik [2]), ended in failure. Crusader soldiers had strong combat effectiveness, and they often had an advantage in the face of an equivalent number of pagan troops. However, they were heavily equipped and were not accustomed to fighting deep in Syria’s hinterland. The Crusader countries relied on European sea supplies. And since the Christian presence in the Levant and Egypt had been irretrievable, the

success of the Crusader operations depended on the division of the Muslim world. The establishment of the Zangi Dynasty and the Ayyub Dynasty dealt a great blow to the Crusader state (Hodgman [6]). When the Mamluk Dynasty, which could effectively integrate Egypt and Syria for a long time, was established, the Crusader state would inevitably perish.

Europe had entered a dark period because of the collapse of the Western Roman Empire. The

Crusades brought back a large number of progressive Eastern cultural ideas, which led to the release of a large number of serfs who became free people. It accelerated the development of craft production and commerce in Western Europe. It was also an important promotion of the Renaissance and modern middle-class commercial civilization. The Crusades laid a strong foundation for modern Europe.

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## HAPPY "STRAW DOGS"

**Abstract.** While ideology of the Laozi, a Pre-Qin Chinese philosophical text, is seen as inhuman as it promotes for treating people indifferently, this article makes an argument that the Laozi, which promotes limited governmental involvement in people's life, is actually beneficial for people because the Laozi regards active governmental interference in people's life as detrimental to the peace of society and happiness of people. Textual analysis is applied throughout the article to prove the argument. In the first part, the Laozi is compared and contrasted with different Pre-Qin Chinese philosophical texts, including Analects and Mozi. The conclusion is obtained that the Laozi regards the Way of nature, which is to minimize active action and allow people to transform naturally, as the most effective law to manage the society; thus, the rulers should all model on it. In the following parts, textual evidence and analysis are applied to demonstrate the Laozi's blueprint of an ideal society: people abandon desire and contention, governors have limited involvement in people's life, and countries are independent and unaggressive. In the final paragraph, the benefits and costs of applying the Laozi philosophy in a modern society is analyzed.

**Keywords:** Laozi, Chinese Pre-Qin philosopher.

If you wonder where the ideology of Chinese people originates from, then you would be interested in Pre-Qin philosophical texts of various schools of thoughts, among which the *Laozi*, or *Dao De Jing*, deserves contemplation. For the modern reader, the *Laozi's* argument in chapter 5 that sages should treat people as "straw dogs," i.e., as the cheap and disposable props of a ceremonial sacrifice, is astonishing:

Heaven and earth are not benevolent;

They treat the myriad creatures as straw dogs.

Sages are not benevolent;

They treat the people as straw dogs.

Is not the space between Heaven and earth like a bellow?

Empty yet inexhaustible!

Work it and more will come forth.

An excess of speech will lead to exhaustion,

It is better to hold on to the mean (Chapter 5, 161). (For this and all subsequent *Laozi* translations,

see Philip J. Ivanhoe (trans.), "*Laozi* (The *Daodejing*)", in *Readings in Classical Chinese Philosophy* (1<sup>st</sup> ed.), chap. 4, eds. Philip J. Ivanhoe & Bryan W. Van Norden (New York: Seven Bridges Press, 2001).

In contemporary society, respect for humanity is the foundation for people's mutual love and compassion. Thus, the *Laozi's* dehumanization of common people is disturbing to us because it is a denial of our basic dignity and rights. However, does the *Laozi* really mean to mistreat people? What is the reason for treating people indifferently as if they are "straw dogs"? In my view, the *Laozi* promotes indifference as a way of discouraging sage-rulers from becoming over-involved in people's life, because the *Laozi* regards active governmental interference in people's life as detrimental to the peace of the society and happiness of the people.

"Straw dogs" don't have knowledge or desire. By comparing people with "straw dogs", the *Laozi*

aims at preventing people from having knowledge or will. The *Laozi* suggests that the pursuit of knowledge is opposite to the pursuit of Way because “in the pursuit of learning, one does more each day; in the pursuit of the Way, one does less each day” in chapter 48. To pursue the Way, *Laozi* suggests rulers should “make sure that the people are without zhi, ‘knowledge’, or desires” in chapter 3 (p. 181). The *Laozi* is not evident about why knowledge is detrimental to the states, but we can speculate that the *Laozi* attempts to make civilians easy to manage. The juxtaposition of “knowledge” and “desire” indicates that these two concepts are highly associated. In my opinion, since “knowledge” is placed before “desire” in the text, “knowledge” gives rise to “desire” first. The *Laozi* criticizes desire for materialistic prosperity by telling people “do not desire what jingles like jade, but what rumbles like rock!” in which “jade”, the most valuable stone, symbolizes wealth, and “rock”, the normal stone, symbolizes frugality (Chapter 39. 179). After knowledge broods desire for richness, this desire would cause contentions between common people as it propels them to compete against each other to gain wealth. Generally speaking, a ruler who cares about people wouldn’t discourage people from learning knowledge and achieving affluence, thus the *Laozi*’s advocacy of “without knowledge or desire” evinces apathia.

The *Laozi*’s indifference towards people distinguishes it from other philosophical texts in ancient China which promote love or concern for the people. *Analects* 1.5 promotes love by advising elites “to guide a state great enough to possess a thousand war chariots: be attentive to affairs and trustworthy; regulate expenditures and treat persons as valuable; employ the people according to the proper season” (For this and all subsequent *Analects* translations, see R. Eno (trans.), *The Analects of Confucius* chap. 1, eds. R. Eno 2015 1.5. 1) Besides advising the ruling classes to “treat persons as valuable”, or care about people, the *Analects* advocate common people to love each other broadly. In 1.6, Kongzi claims that “a

young man should be ... ..broadly caring of people at large” and defines *ren* – (humaneness), the core value of Confucius, as “cherish [ing] people” (1.6. 2). Likewise, the *Mozi* claims in chapter 4 that “heaven desires to have men benefit and love one another”, and “the ancient sage-kings, Yu, Tang, Wen, and Wu loved the people of the world universally, leading them to revere Heaven and worship the spirits” [4].

The *Laozi* has a very different view of such values:

When the great Way is abandoned, there is benevolence and righteousness.

When wisdom and intelligence come forth, there is great hypocrisy.

When the six familial relationships are out of balance, there are kind parents and filial children.

When the state is in turmoil and chaos, they are loyal. (Philip J. Ivanhoe (trans.), “*Laozi (The Daodejing)*”, in *Readings in Classical Chinese Philosophy* (1<sup>st</sup> ed.), chap. 18, eds. Philip J. Ivanhoe & Bryan W. Van Norden (New York: Seven Bridges Press, 2001), p. 167.)

The *Laozi* regards the Way of nature as the most effective law to manage the society, rulers should model themselves the highest law instead of depriving it into artificial “benevolence and righteousness”. In other words, broad love for people is an excess of emotion, which leads to excessive involvement, so it is not as effective as the great Way. *Mozi* regards Heaven as a caring figure “because it claims all and accepts offerings from all”, but the *Laozi* regards Heaven as indifferently limiting its involvement and facilitating creatures’ spontaneous development because “the Way does nothing yet nothing is left undone” (Chapter 37. 177). The *Laozi* explains the relationship between humans and heaven:

People model themselves on the earth.

The earth models itself on Heaven.

Heaven models itself on the Way.

The Way models itself on what is natural (Chapter 25. 192).

The Way never intentionally constructs orders and forces people to follow but people will all grow themselves. To follow the Way, the rulers shouldn’t

disturb the natural transformation process of people and the government should not disturb people's life. The *Laozi* draws a blueprint for an idealistic political structure in which "the more dull and depressed the government, the more honest and agreeable the people. The more active and searching the government, the more deformed and deficient the people" (Chapter 58. 188). "Active and searching" is exemplified by enacting prohibitions and laws to constrain people's freedom. The effect of an active government is "the more taboos and prohibitions there are in the world, the poorer the people... .. The more clear the law and edicts, the more thieves and robbers" (Chapter 57. 187). In other words, the more rulers want to make changes by constructing orders, the more people would break these orders since the laws are unnatural. Therefore, the reason why *Laozi* advises rulers to be indifferent is to reduce their interference in people's lives.

At the same time, *Laozi* advocates rulers to keep people unenlightened to manage them smoothly.

In ancient times, those good at practicing the Way did not use it to enlighten the people,  
but rather to keep them in the dark

The people are hard to govern because they know too much.

And so to rule a state with knowledge is to be a detriment to the state.

Not to rule a state through knowledge is to be a blessing to the state (Chapter 65. 213).

"Knowing too much" makes people "hard to govern" because intelligent people can not be completely agreeable since they perceive the drawbacks of the ruling system. The fact that the *Laozi* wants people to stay "honest and agreeable" demonstrates that it aims at preventing common people from challenging their rulers (Chapter 58. 188). If we think from a modern standpoint, it seems cruel to keep people from thinking freely. However, the *Laozi's* aim is to prevent people from having conflicts. The *Laozi's* disapproval of contention is demonstrated in chapter 3 which claims that "not paying honor to the

worthy leads the people to avoid contention" (Chapter 3. 160), in chapter 8 which claims that "only by avoiding contention can one avoid blame (Chapter 8. 162), and in chapter 81 which claims that "the Way of Heaven is to benefit and not harm. The Way of the sage is to act but not contend (Chapter 81. 200)." Therefore, although anti-intelligence appears to be harmful to people from a modern standpoint since it hampers the development of technology, culture etc, the *Laozi* regards it as a balm because it prevents potential conflicts.

When people are all agreeable and uncontentious, the rulers can indeed minimize their effort in managing people. When the governmental officials have limited power, the people remain "honest and agreeable." This beneficent cycle operates automatically without intentional care.

Since *Laozi* suggests that contentions stem from desire, it advises all people to discard their desire regardless of their social status. *Laozi* claims that desire hampers people from achieving happiness.

The greatest misfortune is not to know contentment.

The worst calamity is the desire to acquire.

And so those who know the contentment of contentment are always content (Chapter 46. 181).

The *Laozi* regards desire as greed; the greedy people are never satisfied with what they have so that they keep searching, acquiring and conquering. The worst calamity is when everyone thinks more achievements can bring more happiness, and they compete against each other to fulfill their own purposes so that society falls into chaos. While common people's desire is mostly demonstrated by yearning for wealth and upgrade, the ruling classes' desire is manifested by their ambitions to conquer territories and hold power above the other people.

When rulers don't have desire, the world can be peaceful. Thus, the *Laozi* claims that a good ruler shouldn't long for conquest and acquisition. *Laozi* promotes peace:

Peace and quiet are the highest ideals;

A military victory is not a thing of beauty.

To beautify victory is to delight in the slaughter of human beings.

One who delights in the slaughter of human beings will not realize his ambitions in the world (Chapter 31.174).

A peaceful and stable society is the prerequisite for the overall happiness of citizens. The *Laozi* pictures the idealistic society in which peace and harmony lasts:

Reduce the size of the state;

Lessen the population.

...

Their clothes fine,

Their houses comfortable,

Their lives are happy.

Then even though neighboring states are within sight of each other,

Even though they can hear the sounds of each other's dogs and chickens,

Their people will grow old and die without ever having visited one another (Chapter 80. 199).

To ensure all civilians can afford "clothes fine" and "houses comfortable", the government ought to reduce financial burden on people because "the people are hungry because those above eat up too much in taxes" (Chapter 75. 196). In order for people to not pay heavy taxes, the government should be less corrupted, which means the rulers should be selfless, or altruistic, because the greedy rulers achieve superabundance by exploiting people at the very bottom of the society. "This is why sages cast off whatever is extreme, extravagant, or excessive" (Chapter 19. 173).

Then how should the ruler apply his power for the sake of its people? The *Laozi* argues that "the greatest of rulers is but a shadowy presence; Next is the ruler who is loved and praised ... Their people all say, "This is just how we are" (Chapter 17. 188). The highest virtue a ruler can display is to minimize his figure and let people live according to their nature instead of rules. The *Laozi* suggests "sages know themselves but do not make a display of themselves; They care for themselves but do

not revere themselves" (Chapter 72. 216). "Not making a display" means not to demonstrate their strength by holding power above other people or winning wars against competitors because "the worst calamity is the desire to acquire" (Chapter 46. 182). When the rulers do not have desire to reign more population, they won't make wars with foreign countries, but they can ensure the abundant material conditions for people to live merrily. When rulers distribute enough resources for everyone to live on, people have less desire to compete against each other to acquire more resources, then the society can be peaceful.

But what if people still want more when they already have sufficient food to eat, clothes to wear and houses to live in? In fact, the *Laozi* not only advises sages to devalue the common people as "straw dogs", but also to devalue themselves.

The *Laozi* advises superior men to be humble.

This is why sages put themselves last and yet come first;

Treat themselves as unimportant and yet are preserved.

Is it not because they have no thought of themselves, that they are able to perfect themselves? (Chapter 7. 162)

Likewise, the *Laozi* advises sages to put themselves in the lowest position to be effective:

If you want to be above the people you must proclaim that you are below them.

If you want to lead the people, you must put yourself behind them.

This is how sages are able to reside above the people without being considered a burden (Chapter 66. 193).

When the superiority of the sages is not acknowledged, people do not contend because "not paying honor to the worthy leads the people to avoid contention. Not showing reverence for precious goods leads them to not steal" (Chapter 3. 160). Contrary to the *Analects* and *Mozi* which advocate honoring superior men, the *Laozi* advocates not honoring the superiority of sages because once people all want to

move upwards of the hierarchy, the original hierarchy will be unstable. Once the original hierarchy is challenged, people would compete against each other to edge into a higher social position, then the society cannot maintain peace. In other words, the sages should be humble in front of the common people so the common people don't feel like they are less happy than people from a higher social status. The superior men usually feel an excess of self-esteem because they are more knowledgeable and influential. To abate this self-esteem, the *Laozi* advises sages to forget their thoughts and achievements—just like the common man forget the pursuit of knowledge and wealth:

They do not make a display of themselves and so are illustrious.

They do not affirm their own views and so are well known.

They do not brag about themselves and so are accorded merit.

They do not boast about themselves and so are heard of for a long time.

Because they do not contend, no one in the world can contend with them (Chapter 22. 169).

If sages abandon their sense of superiority, the common people would be satisfied with their own life and stay simple. Staying simple is beneficial for both common people and rulers because it is the smoothest way for individuals to live and the easiest way for the rulers to govern. When common people and the ruling-class form a harmonious relationship, all people can be content with their situation and the society would become stable.

The *Laozi* claims that if the sages set themselves as examples to be frugal, then common people will not be greedy.

And so sages say,

"I do nothing and the people transform themselves;

I prefer stillness and the people correct and regulate themselves;

I engage in no activity and the people prosper on their own;

I am without desires and the people simplify their own lives.

When people aren't greedy, the society would maintain harmony (Chapter 57. 208).

Then what exactly should the sages do to display their humility, and what benefits is it for the commoners to be unambitious? The *Laozi* exemplifies the effect of sage's modesty that when the sages "cut off cleverness, abandon profit, and robbers and thieves will be no more", people will "not think just of [them] selves" and "make few desires" (Chapter 19. 167, 168). The *Laozi* implies that criminality, exemplified by "robbers and thieves", stems from people's longing for excessive wealth. When people covet more than what they need, they go against the Way of Heaven which "takes from what has excess and augments what is deficient" (Chapter 77. 197). However, "the Way of human beings is not like this. It takes from the deficient and offers it up to those with excess" (Chapter 77. 197). Therefore, the *Laozi* claims that the sages should distribute wealth equally for everyone to maintain the balance of the society instead of widening the economic gap between common people and the superior men. When equal distribution ensures people enough resources to live on and not honoring the superior reduces the psychological gap caused by social status, people can achieve the sense of satisfaction with their material life.

Contentment for material life lays the foundation for people to live spontaneously. *Laozi* regards spontaneity as essential to happiness because it stems from the Way of Heaven, the natural law. The *Laozi* claims that people are naturally prone to stay still, as opposed to strive or contend, when no outside forces are applied to alter them. Since "purity and stillness give the correct law to all under heaven" (p. Chapter 45. 181), "the teeming multitude of things, each returns home to its root; and returning to one's root is called stillness" (Chapter 16. 166). The *Laozi* indicates that people would undergo three stages when they transform: "nameless" is "the beginning of Heaven and earth" (p. 159), then "the myriad

creatures are all in motion” (p. 166), finally everything returns to “stillness” (Chapter 16. 166). When people are in the stage of motion, their desire grows and their action increases, so they should simplify themselves to find peace and happiness.

Contrary to our initial impression, the *Laozi* is much more pro-people than chapter five would seem to suggest. Despite telling rulers not to care about their people, paradoxically it shows a great deal of concern for people because it promotes indifference and non-action by that grant people spontaneity, small government and limited management that allows people to live without constraints of rules, simplicity and modesty that blurs the differences of hierarchy. In the *Laozi* blueprint, countries are independent and unaggressive towards each other because the rulers are unambitious; people are content and uncontentious because they are simple and unenlightened.

However, the *Laozi*'s blueprint has its own cost. Since knowledge is the root for miseries and unrests,—knowledge gives rise to desire; desire drives people to act; action causes conflicts—the *Laozi* aims at cutting the seedling to prevent all maladies. Therefore, peaceful simplicity comes at the price of restraining knowledge and sacrificing culture, which appears to be unbearable to those who seek happiness from wisdom and truth. Eventually, the stability of society is of the utmost importance, then should we be willing to live in a country without culture if its people don't need to suffer from ongoing wars? The happiness of people is of the utmost importance, then should we care if “straw dogs” are benighted if they are able to live in harmony and rest in peace? Although the high price of simple happiness suggested by the *Laozi* appears to be unaffordable for modern society, it can serve as a cogent reference for those who yearn for a modest government.

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## Section 3. Medical science

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### **INFLUENCE OF AEROALLERGEN DOSES ON THE FORMATION OF ALLERGIC DISEASES OF THE RESPIRATORY ORGANS IN CHILDREN OF KIEV**

**Abstract.** The article describes the implementation of saw monitoring of the saturation of atmospheric air with pollen of plants and trees in the urban area of Kiev during the flowering period from April to October (2019), which is necessary to determine the allergen-specific factor of AD in children.

**Keywords:** pollen monitoring, pollution, atmospheric air, BA, child population, Kiev.

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## ВЛИЯНИЕ ПЫЛЬЦЫ АЭРОАЛЛЕРГЕНОВ НА ФОРМИРОВАНИЕ АЛЛЕРГИЧЕСКИХ ЗАБОЛЕВАНИЙ ОРГАНОВ ДЫХАНИЯ У ДЕТЕЙ Г. КИЕВА

**Аннотация.** В статье описано проведение пыльного мониторинга насыщения атмосферного воздуха пылью растений и деревьев в городской черте г. Киева в период цветения с апреля по октябрь (2019), что необходимо для определения аллерген-специфического фактора возникновения БА у детей.

**Ключевые слова:** пылевой мониторинг, загрязнение, атмосферный воздух, БА, детское население, г. Киев.

По определению ВООЗ- глобальная распространенность бронхиальной астмы (БА) является одной из важных проблем общественного здоровья [4, 118–122; 10; 11].

Астма – самое распространенное хроническое заболевание органов дыхания у детей. Примерно 60% детей – астматиков имеют аллергию особенно на перхоть животных, клещей и плесневицы, а также на пыльцу растений и деревьев [10; 12, 21–31].

Из отечественных научных исследований определено, что распространенность БА у детей в Украине составляет от 5–22% [3, 88–91; 4, 118–122; 8, 118–124].

Из данных медицинской статистики МЗ Украины общая заболеваемость БА по г. Киеву в 2019 году составляет – 58,85 на 10 тыс. Дет. населения, а первичная заболеваемость – 5,16 на 10 тыс. дет. населения.

Проведено исследование пыльного мониторинга насыщения атмосферного воздуха пылью растений в городской зоне г. Киева в период цветения с апреля по октябрь в течение 2019 года [1, 165–168; 2; 6, С. 20].

Отбор образцов биоаэрозольного состава атмосферы для их стандартного контроля осу-

ществляется с помощью 7-суточного Волюметрического пробоотборника «Burkard Pollen Trap». Для проведения исследований были использованы микроскоп световой «Lomo» с увеличением микрообъектов 400 × (10х, 40х) прибор для фотоувеличения микрообъектов TREK DCM310 (USB2.0) с оптической характеристикой 3,0 Мрх; компьютер совместим с оптической системой. Микрофотосъемки выполнялось с помощью оптической системы и программного обеспечения TREK.

Научное исследование проведено на базе Института общественного здоровья им.А.Н. Марзеева, в лаборатории качества воздуха проведено наблюдение за насыщением воздуха пылью растений проводили в городской зоне г. Киева в период цветения с апреля по октябрь в течение 214 дней 2019 года.

Как самые характерные насыщатели воздуха пылью были выбраны 32 растения (древовидные, кустарниковые и травянистые), которые представлены в ландшафте города.

Изменения количества зерен пыльцы представлены на (рис. 1).

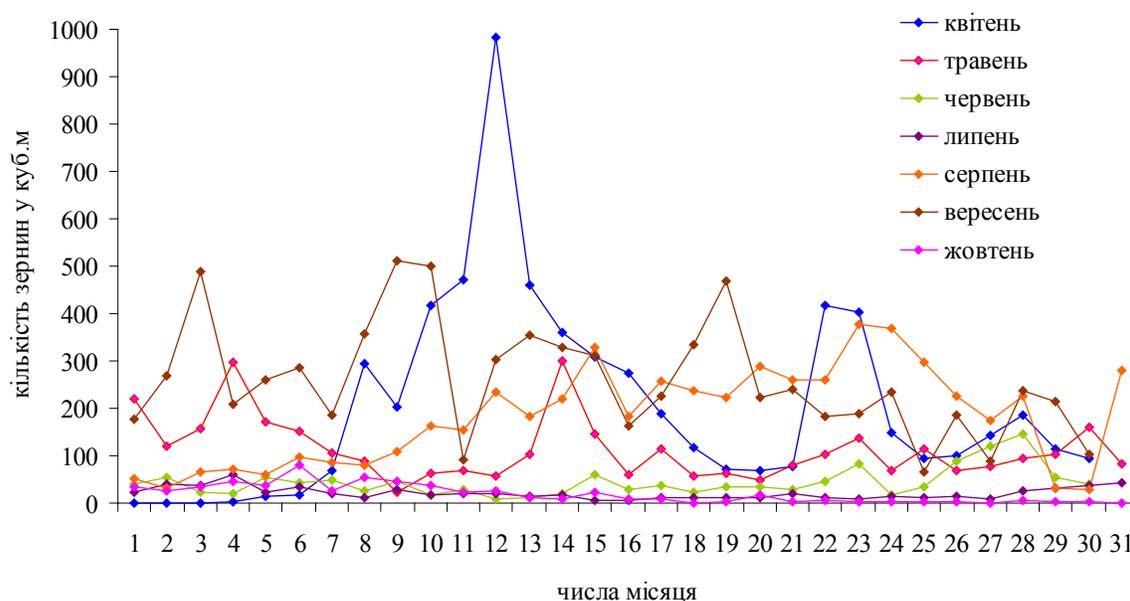


Рисунок 1. Ежедневная динамика количества зерен пыльцы всех растений за период апрель-октябрь 2019 (шт / куб.м)

Источник: данные ГУ «ИГЗ им. А. Н. Марзеева НАМН Украины»

Из графиков, представленных на (рис. 1), можно отметить, что насыщение воздуха пылью происходило неравномерно, а по мере наступления фазы цветения растений. В первую неделю апреля насыщения воздуха пылью было постепенным и достигло 69 зерен на куб. Далее по мере нарастания периода цветения растений концентрация пыли в воздухе резко увеличилась и достигла максимального значения (982 шт./куб.м) уже в зоне середины месяца. В течение следующей недели происходило плавное снижение концентрации частиц пыли в первоначального значения 69 шт./куб.м, как и в первую неделю цветения растительности. Скорее всего такое снижение концентрации пыли связано с несколькими дождевыми днями, которые были в середине месяца. Дальнейший рост количества пыли в воздухе до значения 400 шт./куб.м произошло за один день, с последующим падением концентрации частиц в воздухе до уровня 90 шт./куб.м и на таком уровне держалось до окончания апреля. В течение 23 дней апреля превалировал пыльца тополя, но фиксировали также зернышка клена, амброзии, ольхи, маревых, сложноцветных, ивы. Насыщение пыль-

цей растений воздуха в мае происходило более волнообразным типом, без очень резких выбросов в отличие от апрельских показателей. Концентрация зерен пыли в воздухе менялась от наименьшего показателя 22 шт./куб.м до максимального значения 300 шт./куб.м в середине месяца. Во второй половине мая концентрация пыли колебалась в пределах значений 50–160 зерен/куб.м в волнообразном режиме. В течение мая фиксировали пыльца 19 растений и продолжали цветения апрельские растения. В июне насыщения воздуха частицами пыли происходило в очень низких значениях с минимумом 9 шт./куб.м до максимума 145 шт./куб.м. Концентрация пыли в воздухе в течение 3-х недель месяца не превышала отметки 90 шт./куб.м. Далее в течение двух дней произошел спад насыщения воздуха пылью до 18 зерен/куб.м с последующим ростом до максимума и спада до уровня 44 шт./куб.м к концу июня. Палитра растительной пыли была насыщена частицами 19 растений. В июле концентрация пылевых зерен не превышала 44 шт./куб.м. График июльских изменений концентрации пыли показывает практически равномерный характер

насыщения воздуха в течение всего месяца. Присутствовали частицы 13 растений, которые продолжали цветения еще с мая.

В августе характер изменений насыщенности воздуха пылью растений носил обуреваемый тип, похожий на майский. Отмеченные три пиковые значения концентрации: 329, 378 и 280 зерен/куб.м. При этом произошло уменьшение цветущих растений практически вдвое (до 7), но превалировала уже везде амброзия, которая цветет в течение всего теплого периода года.

И, наконец, октябрьская кривая насыщения зернами растений воздуха, очень похожа по характеру к июльской, с равномерным фоном показателей, не превышали значения 55 шт / куб.м. в течение двух декад. Только один раз в этот период произошел выброс пыли до 80 шт / куб.м. Третья декада низкими значениями концентрации пыли (от 1 до 16 зерен на куб.м) показывала, что интенсивность цветения идет на спад. Доцветали полынь, лебеда, астровые, амброзия.

Для дальнейшего анализа опыления городского воздуха пылью деревьев, было решено разделить растения по количеству зерен пыли на три группы.

К первой группе вошла наибольшее количество растений (15 из 32, или 46,88%) с ежедневным насыщением воздуха пылью в пределах до 50 зерен / куб.м [Айлант (*Ailanthus L.*), Астровые (*Compositae L.*), Орех (*Juglans L.*), Дуб (*Quercus L.*), Конопляные (*Cannabis L.*), Липа (*Tilia L.*), Осоковые (*Superaceae L.*), зонтики (*Umbelliferae L.*), подорожниковых (*Plantago L.*), Розовые (*Rosaceae L.*) Хвойные Ель (*Picea L.*), Шалфей (*Rumex L.*), шелковица (*Morus L.*), Ясень (*Fraxinus L.*), Яснотковые (*Labiatae L.*)]. Эти 15 растений насыщали воздух ежедневно суммарным количеством пыли, которая равнялась 182 зерна куб.м.

Ко второй группе с интенсивностью запыленности воздуха от 50 до 100 зерен/куб.м ежедневно увишли такие 5 растений [Береза (*Betula L.*), Злаковые (*Poaceae L.*), Полынь (*Artemisia L.*),

Тополь (*Populus L.*), Хвойные Сосна (*Pinus L.*)], или 15,32%. Суммарная ежедневное количество зерен пыли от данных 5 растений составляла 343 зерна/куб.м.

И наконец третья группа была сформирована растениями с интенсивностью ежедневного зарегистрированного пыления 100 зерен / куб.м и более из других 6 растений [Амброзия (*Ambrosia L.*), Ива (*Salix L.*), вяз (*Ulmus L.*), Клен (*Acer L.*), Крапива (*Urtica L.*), лебеда (*Chenopodiaceae L.*)]. Их доля от общего количества растений, вошедших в исследование, составила 18,75%. Последние 6 растений из нашего исследования насыщали атмосферу города ежедневно 1849 зерен/куб.м.

Итак, насыщенность воздуха города пылевыми зернами можно распределить следующим образом: наибольший вклад давали растения третьей группы, за ними были растения второй группы и меньше пыления было зарегистрировано от наибольшего количества растений первой группы.

Необходимо также отметить, чем меньше пыли дает растение в воздух ежедневно, тем меньше период опыления, и наоборот, увеличение ежедневной концентрации пыли в воздухе свидетельствует о длительном времени цветения растения и постоянного насыщения атмосферы пылью.

Такой вывод необходимо учитывать при экстраполяции на здоровье населения, особенно, лиц, склонных к аллергическим заболеваниям.

При анализе полученных данных, мы оценивали количество пылевых зерен как самой, так и меньшего количества. Такая тактика, на наш взгляд, оправдывает себя с точки зрения того, что единичные пылевые зерна вряд ли могут очень серьезно навредить здоровью человека, а вот большие концентрации этого продукта цветения растений имеют угнетающее воздействие на состояние здоровья и особого, ухудшение следует ожидать во время процесса одновременного цветения нескольких растений. А такое в природе постоянно.

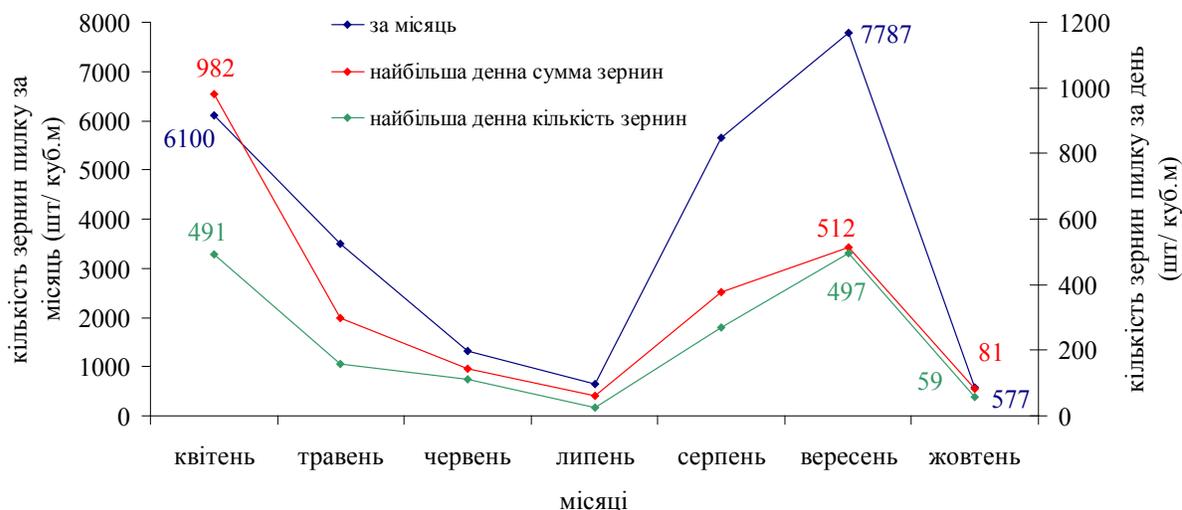


Рисунок 2. демонстрирует такую ситуацию  
 Источник: данные ГУ «ИГЗ им. А. Н. Марзеева НАМН Украины»

Рисунок 2 Динамика количества зерен пыльцы за месяц, в суммарной дневной количества и наибольшее значение за день (шт./куб.м)

Вариативность процесса опыления в нашем исследовании, как показывает (рис. 2), имеет 2 пиковые зоны: это апрель и сентябрь.

Можно отметить, что динамика процесса высвобождения пыльцы как ежедневной, так и ме-

сячной продолжительности происходит синхронно для трех потоков подсчета пыльцевых зерен. Для обозначения точек графика были выбраны только максимальные и минимальные значения подсчета пыльцевых зерен.

Такой подход был применен с целью большей наглядности графики. Все количественные характеристики приводятся в (табл. № 1).

Таблица № 1. – Распределение количества зарегистрированных зерен ежедневно и в течение периода наблюдения

Месяца 2019р	Количество зарегистрированных зерен/куб. м воздуха, шт		
	в течение месяца	Наибольшая дневная сумма зерен всех растений	Наибольший дневной показатель количества зерен
Апрель	6100	982	491
Май	3508	300	159
Июнь	1313	145	112
Июль	651	61	25
Август	5660	378	270
Сентябрь	7787	512	497
Октябрь	577	81	59
ВСЕГО	25596	2459	1613

Полученные характеристики будут служить информативным источником по концентрации пыльцы в воздухе м. Киева для своевременного использования противоаллергических средств.

По данным исследования издание «The Lancet Planetary Health» [[https://naroomask.ru/6043?gclid=EAIaIQobChMI\\_uHEisqi6gIVg8CyCh0obAXJEAMYASAAEgKhVfD\\_BwE](https://naroomask.ru/6043?gclid=EAIaIQobChMI_uHEisqi6gIVg8CyCh0obAXJEAMYASAAEgKhVfD_BwE)] количество пыльцы будет расти ежегодно. Исследователи объясняют это феноменом глобального потепления: рост объема углекислого газа в атмосфере оказывает положительное влияние на

количество пыльцы будет расти ежегодно. Исследователи объясняют это феноменом глобального потепления: рост объема углекислого газа в атмосфере оказывает положительное влияние на

пыльцеобразование, что может приводить к усилению аллергических реакций у населения.

При проведении пыльного мониторинга насыщения воздуха пылью растений в г. Киеве установлено: по данным 7-мес. (214 дней) круглосуточного аэриобиологического мониторинга ГУ ИГЗ НАМНУ:

Среди 32 растений отобранных к исследованию крупнейшими аллергенами являются

1 место – Амброзия 10795 зер/м<sup>3</sup> (средн. = 50,45 зер/м<sup>3</sup>)

2 место – вяз 3521 зер/м<sup>3</sup> (средн. = 16,45 зер /м<sup>3</sup>)

3 место – лободовые 2361 зер/м<sup>3</sup> (средн. = 11,03 зер/м<sup>3</sup>)

Итак, для практической медицины важно научное обоснование критериев оценки опасности обусловленной загрязнением атмосферного воздуха высокими концентрациями пыли растений и деревьев для клинического обоснования аллерген-специфической диагностики аллергических заболеваний органов дыхания и своевременной квалифицированной медицинской помощи детскому населению в предотвращении возникновения аллергических заболеваний органов дыхания. [7, 51–55; 9, 976–990; 11].

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## Section 4. Agricultural sciences

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### SENSITIVITY OF SOFT WHEAT CULTIVARS (*TRITICUM AESTIVUM*) FROM RUST

**Abstract.** This article addresses the problem of resistance of some wheat cultivars to yellow rust, brown rust, and black rust of the stalk. Generally new genotypes, characterized by a good resistance from rust, especially to yellow rust of leaves. Among the cultivars under study, the lowest resistance to brown rust results: Fioco x Uniculum 547/3-2-3-4-2. Ardenica x Uniculum 1110/3-1-3-2. Cultivars with parental components, the Uniculum line at the intersection, are susceptible to brown rust. These cultivars pass grade III infection.

From the results we conclude that the wheat cultivars most susceptible to black rust are the cultivars: Fioco x Uniculum 547/2-1-5-3-2, Fioco x Uniculum 547/3-2-3-4-2 and Ardenica x Uniculum 1110/3-1-3-2. Positive is the fact that the cultivars Dajti, Bulgar 9 x VS-19/1-2-4 and Virginia x IKB6/2-3-6-3-3 have been resistant to three pathogens. The most effective way to avoid production losses, remains genetic stability, than the use of fungicides to fight disease.

Plant tissues, particularly affected by rust, not only disrupt physiological functions, but are also under the influence of toxic substances arising from these infections.

**Keywords:** wheat, cultivars, rust, diseases, infection.

#### I. Introduction

Intensive cultivation of soft wheat (*Triticum aestivum*), can not be understood detached from the high genetic viability of cultivars adoptable in ecological environments.

No matter how high the productivity level and production stability of a soft wheat cultivar, if it does

not possess high genetic resistance to infections of various diseases in the leaves and stems, the production would be shaken especially in years of epiphysis.

Despite the efforts of plant breeders for high stability of soft wheat genotypes, including the application of the selection method of «crossbreeding», genotypes are still seen that are affected to

a certain degree by diseases, especially from rust, which in the favorable years for their development, grain production of wheat decreases from 8–15% to 25%.

Stem rust of wheat 3300 years old found in Israel [1] (M. E. Kislev. 1982) [2] Heinrich Anton De Bary (1866) showed that the two fungi, *P. graminis* on cereals and *Aecidium berberidis* on barberry, were different stages of the same organism.

In his book “Untersuchungen über die Brandpilze” (1853; “Researches Concerning Fungal Blights”), he correctly asserted that fungi associated with rust and smut diseases of plants are the cause, rather than the effect, of these diseases. In 1865 he proved that the life cycle of wheat rust involves two hosts, wheat and barberry. He was the first to show (1866) that lichens consist of a fungus and an alga in intimate association; he coined the term symbiosis in 1879 to mean an internal, mutually beneficial partnership between two organisms.

Eriksson and Henning (1894) showed that stripe rust was a separate rust of grasses and named it *Puccinia glumarum*. This name remained valid until Hylander et al. (1953), followed by Cummins and Stevenson (1956), revived the name *Puccinia striiformis* West. R. (W. Stubbs 1985).

Stripe rust, which is considered to be the current major rust disease affecting winter cereal production across the world, has been studied intensively for over a century [3] (Wanquan Chen et al 2013).

Three wheat diseases, stem, leaf, and stripe (or yellow) rust, caused by *Puccinia graminis* f. sp. *tritici* (Pgt), *P. triticina* (Ptr), and *P. striiformis* f. sp. *tritici* (Pst), respectively, cause significant losses of grain production (McIntosh et al., 1995). Pgt, and in particular the broadly virulent African strain Ug 99, is on many wheat breeders' minds because this disease had been considered generally under control [4] (Jeffrey G. Ellis et al 2014).

Urediniospores of *puccinia triticina* can be wind-disseminated and infect host plants hundreds of kilometers from their source plant, which can result in

wheat leaf rust epidemics on a continental scale [5] (Melvin D. Bolton et al 2008).

The most effective way to avoid production losses remains that of genetic stability, rather than using fungicides to disease fight.

Plant tissues, particularly affected by rust, not only disrupt physiological functions, but are also under the influence of toxic substances arising from these infections.

The most typical case of this phenomenon is that of the leaf tissues being affected by yellow rust (*Puccinia Striiformis*) and brown rust (*Puccinia triticina*).

## II. Material and methods

This study was conducted on soft wheat cultivars, experimented in the soils of Experimental Didactic Basis of “Fan S. Noli”, University of Korça. Young soft wheat cultivars were tested in the control nursery.

The study belongs to 3 years 2016–2018. The test was set up with 2 repetitions, with variant size 12.5 m<sup>2</sup>, a size that is acceptable for this type of test.

Seed sowing was carried out at a distance of 15 cm between rows. The varieties are separated by 30 cm from each other. Before sowing the seeds were disinfected with Raxil 0.2% fungicide.

Agrotechnical services were performed in accordance with the methodology defined by the field experimentation technique.

The soil is of medium Subargilore type, with equal fertility. The evaluation of soft wheat cultivars for resistance to leaf and stem diseases was carried out at the most appropriate stage, that of milk baking, which coincides with the optimal «freshness» of pustules, caused by infectious fungi.

In the first year of the study the evaluation was performed on 18.6.2016, in the second year of the study on 21.6.2017 and in the third year on 19.6.2019. The assessment for sustainability was carried out on the methodology planned by the authors Melcer – Parker, where in each variant for each cultivar of soft wheat, by lot (randomization), were selected 20 plants and in each plant was performed

the assessment of disease susceptibility, on the first and second leaf under the spike.

While stalk rust was analyzed on the stalk of each plant analyzed.

According to the applied methodology, there are 5 rating scales, according to the area occupied by pustules on leaves and stalks, of their total area.

Specifically, this assessment is made according to 5 scales:

- Grade I No infection 0% (R) Resistant.
- Grade II Infection up to 10% (L.R) Easily resistant.
- Grade III Infection up to 25% (M.R) Moderately resistant.
- Grade IV Infection up to 40% (M.P) Moderately Infection.

- Grade V Infection over 60% (S.P) Super Infection.

In the 1st assessment group, we find that the plants are clearly clean, without signs of uredopustules and necrotic areas.

In classification II, uredopustules and necrotic areas, comprise about 10% of the leaf and stalk area.

With the same phytopathological logic, was realized the evaluation for the III, IV and V classification.

**III. Results and their discussion**

The following tables introduce us with the values of susceptibility of soft wheat cultivars to leaf and stem diseases, according to years of study.

Statistical processing was performed through Anova analysis.

Table 1. – Infection of soft wheat cultivars by rust for three years of study

Year	Name of the cultivar	Factor B→ Factor A ↓	% of Infection												Σ%	Mean %
			P.striiformis (b <sub>1</sub> )				P.triticina (b <sub>2</sub> )				P.graminis (b <sub>3</sub> )					
			PI	PII	Σ	Mea	PI	PII	Σ	Mea	PI	PII	Σ	Mea		
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>
2015-2016	Dajti	a <sub>1</sub>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Agimi x Unicum 1082/2-4-1-2	a <sub>2</sub>	0	0	0	0	4	3	7	3.5	0	0	0	0	7	1.17
	Chiarono x Ardenica 113/1-2-5	a <sub>3</sub>	0	0	0	0	6	7	13	6.5	4	2	6	3	19	3.17
	Boranjka x SM 27 x SM-271413/1-2-1	a <sub>4</sub>	0	0	0	0	5	4	9	4.5	3	1	4	2	13	2.17
	Fioco x Unicum 547/2-1-5-3-2	a <sub>5</sub>	0	0	0	0	0	0	0	0	11	13	24	12	24	4
	G-22-78 x Sylva x IKB35	a <sub>6</sub>	0	0	0	0	0	0	0	0	3	1	4	2	4	0.67
	Fioco x Agimi 1/8-1-1-2	a <sub>7</sub>	0	0	0	0	4	6	10	5	5	5	10	5	20	3.33
	Fioco x Unicum 547/3-2-3-4-2	a <sub>8</sub>	0	0	0	0	11	13	24	12	13	10	23	11.5	47	7.83

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
2015-2016	L.V.S.	a <sub>9</sub>	3	2	5	2.5	6	4	10	5	0	0	0	0	15	2.5
	Ardenica x Uniculum 1110/3-1-3-2	a <sub>10</sub>	0	0	0	0	13	11	24	12	11	6	17	8.5	31	5.16
	Zvezda x Aniene	a <sub>11</sub>	2	2	4	2	0	0	0	0	4	1	5	2.5	9	1.5
	(Fioco x Agimi) x (Agimi x Agimi)	a <sub>12</sub>	0	0	0	0	3	2	5	2.5	5	7	12	6	17	2.83
	Chiaro x Ardenica 1113/1-3-6-2	a <sub>13</sub>	0	0	0	0	4	6	10	5	3	4	7	3.5	17	2.83
	Sylva	a <sub>14</sub>	4	5	9	4.5	0	0	0	0	5	2	7	3.5	16	2.66
	Progres	a <sub>15</sub>	3	1	4	2	0	0	0	0	3	0	0	0	4	0.67
	Bulgar 9 x VS-19/1-2-4	a <sub>16</sub>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Virginia x IKB6/2-3-6-3-3	a <sub>17</sub>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Σbi		12	10	22	11	56	56	112	56	70	49	119	59.5	243
	Mean(bi)		0.7	0.58	0.65		3.29	3.29	3.29		4.11	2.88	7		2.38	2.38
2016-2017	Dajti	a <sub>1</sub>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Agimi x Uniculum 1082/2-4-1-2	a <sub>2</sub>	0	0	0	0	2	0	2	1	0	0	0	0	2	0.33
	Chiarono x Ardenica 113/1-2-5	a <sub>3</sub>	0	0	0	0	4	2	6	3	4	3	7	3.5	13	2.16
	Boranjka x SM 27 x SM-271413/1-2-1	a <sub>4</sub>	0	0	0	0	3	2	5	2.5	2	0	2	1	7	1.17
	Fioco x Uniculum 547/2-1-5-3-2	a <sub>5</sub>	0	0	0	0	0	0	0	0	8	9	17	8.5	17	2.83
	G-22-78 x Sylva x IKB35	a <sub>6</sub>	0	0	0	0	0	0	0	0	3	5	8	4	8	1.33
	Fioco x Agimi 1/8-1-1-2	a <sub>7</sub>	0	0	0	0	1	1	2	1	4	3	7	3.5	9	1.5
	Fioco x Uniculum 547/3-2-3-4-2	a <sub>8</sub>	0	0	0	0	8	5	13	6.5	11	9	20	10	33	5.5
	L.V.S.	a <sub>9</sub>	1	1	2	1	4	4	8	4	0	0	0	0	10	1.67

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
2016-2017	Ardenica x Uniculum 1110/3-1-3-2	$a_{10}$	0	0	0	0	12	10	22	11	10	7	17	8.5	39	6.5
	Zvezda x Aniene	$a_{11}$	3	1	4	2	3	1	4	2	5	5	10	5	18	3
	(Fioco x Agimi) x (Agimi x Agimi)	$a_{12}$	0	0	0	0	0	1	1	0.5	5	2	7	3.5	8	1.33
	Chiaro x Ardenica 1113/1-3-6-2	$a_{13}$	0	0	0	0	11	7	18	9	4	3	7	3.5	25	4.16
	Sylva	$a_{14}$	3	3	6	3	0	0	0	0	4	6	10	5	16	2.66
	Progres	$a_{15}$	5	3	8	4	0	0	0	0	2	0	2	1	10	1.67
	Bulgar 9 x VS-19/1-2-4	$a_{16}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Virginia x IKB6/2-3-6-3-3	$a_{17}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		$\Sigma bi$	12	8	20	10	48	33	81	40.5	62	52	114	48	215	
	Mean(bi)	0.7	0.47	0.58		2.82	1.94	2.38		3.64	3.05	3.35		2.11	2.11	
2017-2018	Dajti	$a_1$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Agimi x Uniculum 1082/2-4-1-2	$a_2$	0	0	0	0	2	3	5	2.5	0	0	0	0	5	0.83
	Chiarono x Ardenica 113/1-2-5	$a_3$	0	0	0	0	5	4	9	4.5	3	3	6	3	15	2.5
	Boranjka x SM 27 x SM-271413/1-2-1	$a_4$	0	0	0	0	3	3	6	3	2	4	6	3	12	2
	Fioco x Uniculum 547/2-1-5-3-2	$a_5$	0	0	0	0	0	0	0	0	10	8	18	9	18	3
	G-22-78 x Sylva x IKB35	$a_6$	0	0	0	0	0	0	0	0	1	1	2	1	2	0.33
	Fioco x Agimi 1/8-1-1-2	$a_7$	0	0	0	0	3	2	5	2.5	4	3	7	3.5	12	2
	Fioco x Uniculum 547/3-2-3-4-2	$a_8$	0	0	0	0	9	6	15	7.5	10	8	18	9	33	5.5
L.V.S.	$a_9$	3	1	4	2	4	3	7	3.5	0	0	0	0	11	1.83	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Ardenica x Uniculum 1110/3-1-3-2	a <sub>10</sub>	0	0	0	0	10	12	22	11	10	7	17	8.5	39	6.5
	Zvezda x Aniene	a <sub>11</sub>	2	2	4	2	2	2	4	2	5	6	11	5.5	19	3.16
	(Fioco x Agimi) x (Agimi x Agimi)	a <sub>12</sub>	0	0	0	0	1	1	2	1	5	5	10	5	12	2
	Chiaro x Ardenica 1113/1-3-6-2	a <sub>13</sub>	0	0	0	0	7	4	11	5.5	4	2	6	3	17	2.83
	Sylva	a <sub>14</sub>	3	4	7	3.5	0	0	0	0	5	6	11	5.5	18	3
	Progres	a <sub>15</sub>	3	3	6	3	0	0	0	0	1	1	2	1	8	1.33
	Bulgar 9 x VS-19/1-2-4	a <sub>16</sub>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Virginia x IKB6/2-3-6-3-3	a <sub>17</sub>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Σbi	11	10	21	13.5	46	40	86	42.5	60	54	114	57	221	
		Mean(bi)	0.64	0.58	0.61		2.7	2.35	2.52		3.53	3.17	3.35		2.16	2.16
		Σbi Tot.	35	28	63		150	129	279		192	155	347		689	
		Mean(bi)	0.68	0.55	0.61		2.94	2.52	2.73		3.76	3.03	3.4		2.25	2.25

Note: The result is marked with Y.

Fit Group

Oneway Analysis of Y By Years = No significant

Oneway Analysis of Y By R = No significant

Oneway Analysis of Y By A

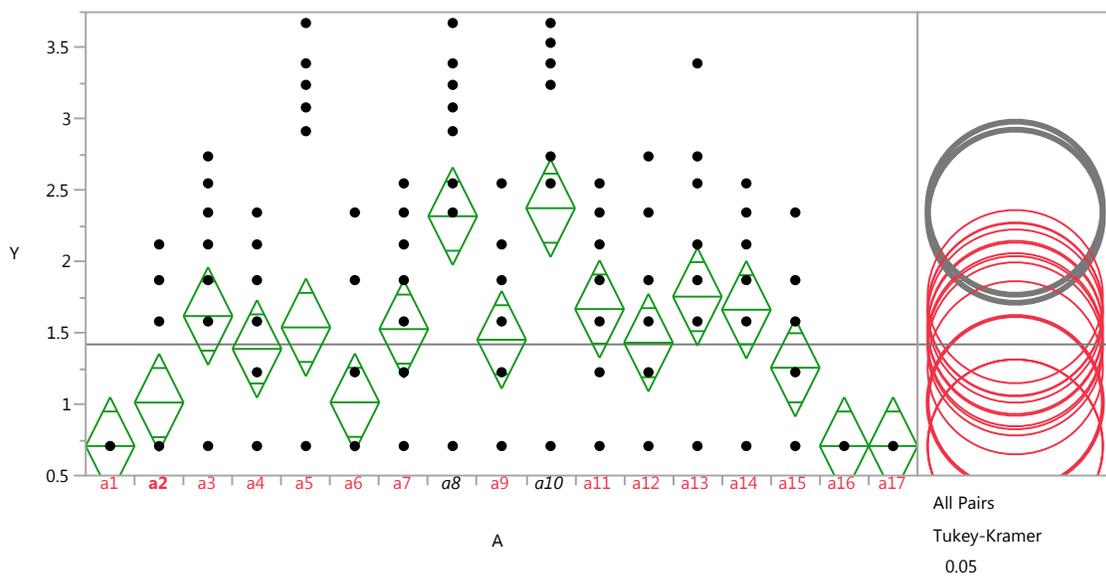


Figure 1. Box plot diagram (variances, standard deviation and mean) for % of infection by cultivars

Table 2. – Oneway Anova: Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob> F
A	16	70.28060	4.39254	8.0542	<.0001*
Error	289	157.61309	0.54537		
C. Total	305	227.89370			

Table 3. – Means Comparisons: Comparisons for all pairs using Tukey-Kramer HSD

q*	Alpha
3.48983	0.05

Table 4. – Connecting Letters Report

A	Estimate	Std Error	DF	Lower 95%	Upper 95%	Mean	Mean
a <sub>10</sub>	2.3754722	0.04891255	64	2.277758	2.4731863	2.3754722	a
a <sub>8</sub>	2.3191278	0.04891255	64	2.221414	2.4168418	2.3191278	a
a <sub>3</sub>	1.61865	0.04891255	64	1.520936	1.716364	1.61865	ab
a <sub>11</sub>	1.6679389	0.04891255	64	1.570225	1.7656529	1.6679389	ab
a <sub>13</sub>	1.7549833	0.04891255	64	1.657269	1.8526974	1.7549833	ab
a <sub>14</sub>	1.6630333	0.04891255	64	1.565319	1.7607474	1.6630333	ab
a <sub>5</sub>	1.5391222	0.04891255	64	1.441408	1.6368363	1.5391222	abc
a <sub>7</sub>	1.5271833	0.04891255	64	1.429469	1.6248974	1.5271833	abc
a <sub>2</sub>	1.0120778	0.04891255	64	0.914364	1.1097918	1.0120778	bc
a <sub>4</sub>	1.3882611	0.04891255	64	1.290547	1.4859752	1.3882611	bc
a <sub>6</sub>	1.0136722	0.04891255	64	0.915958	1.1113863	1.0136722	bc
a <sub>9</sub>	1.4524944	0.04891255	64	1.35478	1.5502085	1.4524944	bc
a <sub>12</sub>	1.4320111	0.04891255	64	1.334297	1.5297252	1.4320111	bc
a <sub>15</sub>	1.2561778	0.04891255	64	1.158464	1.3538918	1.2561778	bc
a <sub>1</sub>	0.7071	0.04891255	64	0.609386	0.804814	0.7071	c
a <sub>16</sub>	0.7071	0.04891255	64	0.609386	0.804814	0.7071	c
a <sub>17</sub>	0.7071	0.04891255	64	0.609386	0.804814	0.7071	c

*Levels not connected by same letter are significantly different.*

Table 5. – Oneway Anova Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob> F
B	2	36.33219	18.1661	28.7340	< 0.0001*
Error	303	191.56150	0.6322		
C. Total	305	227.89370			

### Oneway Analysis of Y By B

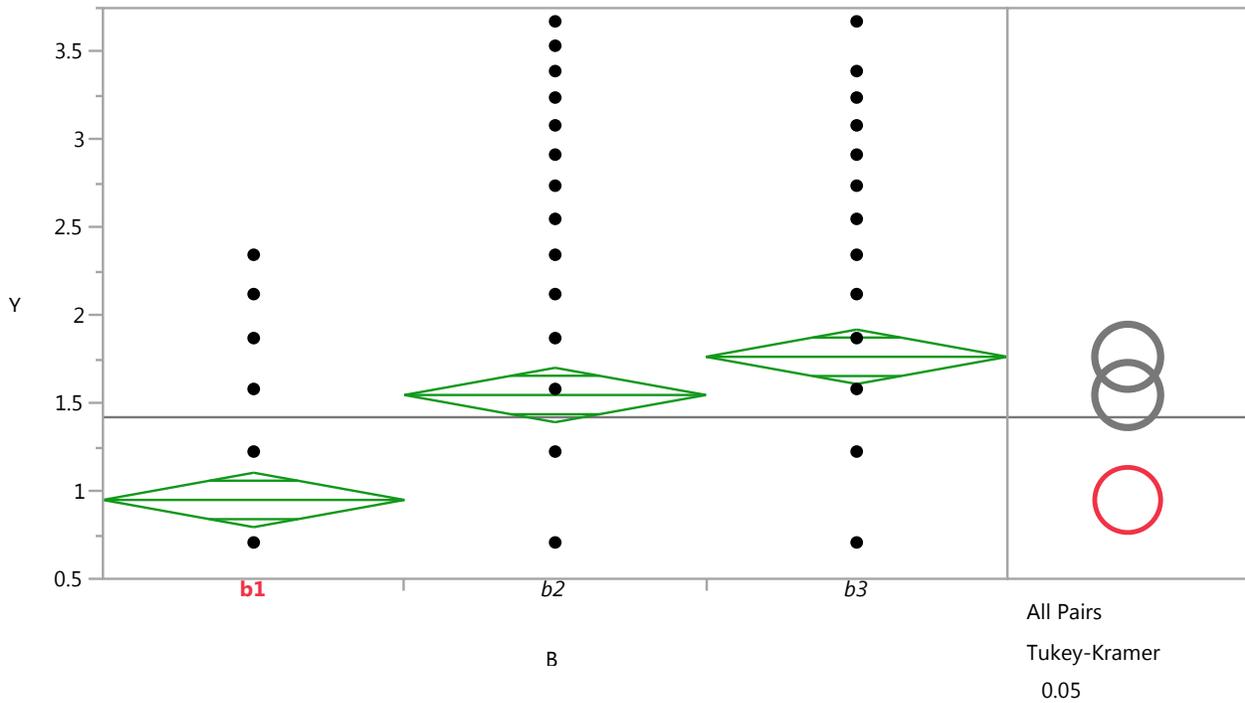


Figure 2. Box plot diagram (variance, standard deviation and mean) for % of infection from all three pathogens

Table 6. – Means Comparisons: Comparisons for all pairs using Tukey-Kramer HSD Confidence Quantile

q*	Alpha
2.35536	0.05

Table 7. – Connecting Letters Report

Level	Mean
b <sub>3</sub>	1.7642922 a
b <sub>2</sub>	1.5467206 a
b <sub>1</sub>	0.9492529 b

*Levels not connected by same letter are significantly different*

Table 8. – Ordered Differences Report

Level	Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value
b <sub>3</sub>	b <sub>1</sub>	0.8150392	0.1113391	0.552795	1.077283	< 0.0001*
b <sub>2</sub>	b <sub>1</sub>	0.5974676	0.1113391	0.335224	0.859712	< 0.0001*
b <sub>3</sub>	b <sub>2</sub>	0.2175716	0.1113391	-0.044672	0.479816	0.1256

*Regression analysis which predicts the result in depending on the indicators which are Cultivars, pathogens and three years of experiment 2016, 2017 and 2018 taken in the test*

**Response Y. Actual by Predicted Plot**

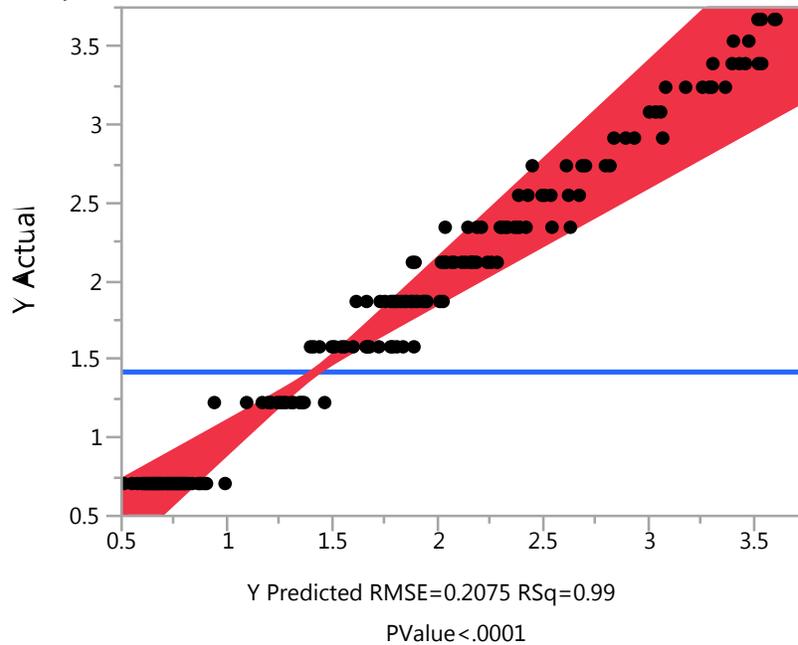


Figure 3. Connection indicators of factors: cultivar pathogen, and years

Summary of the regression report (Summary of Fit) shows a summary for a one-sided analysis of variance (RSquare), Which measures the proportion of variation calculated by adjusting the tools for each factor level. The remaining variation is attributed to random error (Tab 9).

An RSquare closer to 1 indicates a better fit of data than an RSquare closer to 0. An RSquare closer

to 0 indicates that the model is not a much better response predictor than the response means.

Analysis of variance shows that probability sources cause statistically proven changes in values with a probability of less than 0001. This allows us to continue more detailed analysis and then make parameter estimates (Table 10–14).

Table 9.– Effect Summary. Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	241	225.13761	0.934181	21.6929
Error	64	2.75609	0.043064	<b>Prob&gt; F</b>
C. Total	305	227.89370		<.0001*

The value < 0.0001 (Tab 10) of the quadrant shows that the analysis of variance has statistically proven differences and also shows an interaction between cultivars, pathogens and years. We can not

say the same for the years separated from each other for them there is no statistical proof as well and the interaction between them is missing. This can be influenced by the climate.

Table 10.– Effect Tests

Source	N parm	DF	Sum of Squares	F Ratio	Prob> F
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
A	16	16	70.28060	102.0005	<.0001*
B	2	2	36.33219	421.8408	<.0001*

1	2	3	4	5	6
R	1	1	0.84273	19.5693	<.0001*
Year	2	2	0.40678	4.7230	0.0122*
Year*R	2	2	0.11480	1.3329	0.2709
Year *A	32	32	4.21450	3.0583	<.0001*
R*A	16	16	0.91442	1.3271	0.2091
Year *R*A	32	32	1.67436	1.2150	0.2504
Year *B	4	4	0.44676	2.5936	0.0446*
R*B	2	2	0.22914	2.6605	0.0776
Year *R*B	4	4	0.28404	1.6490	0.1729
A*B	32	32	103.25591	74.9293	<.0001*
Year *A*B	64	64	5.13103	1.8617	0.0070*

The Effect Tests (Tab 10) and Profiles shown below (Fig. 4) clearly show how the infection has been caused by pathogens over the years. The first profile shows that the infection between the years is slightly higher in the third year.

The second profile shows the level of infection, caused in the two repetitions where a very small

increase is shown in the second repetition. Regarding cultivars it seems that the infection from pathogens is higher in the cultivar Ardenica x Unicum 1110/ 3-1-3-2. In the fourth profile, is clearly seen, a higher increase of black rust infection (Puccini graminis), compared to the other two pathogens

**Prediction Profiler**

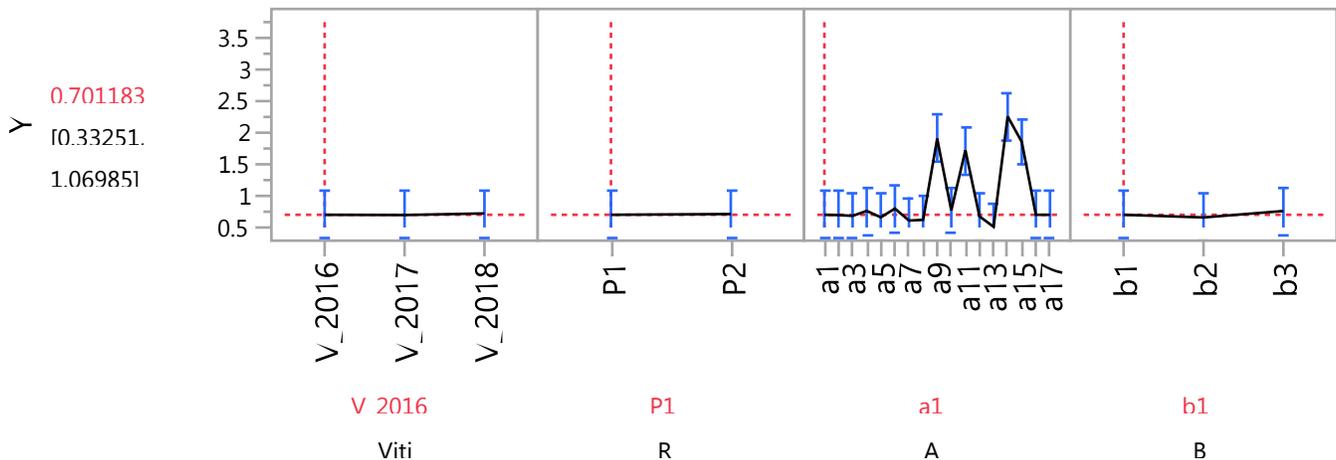


Figure 4. Infection in years, repetitions, cultivars and type of pathogen

Table 11. – Infection in years, repetitions, cultivars and type of pathogen

Term	DF	Sum of Squares	F Ratio	Prob> F
Year	140	12.27226	2.0356	0.0009*
R (Repetition)	89	5.06984	1.3228	0.1191
A (Cultivar)	224	186.48116	19.3319	< 0.0001*
B (Pathogen)	140	146.68942	24.3309	< 0.0001*

Table 12.– Multiple Comparisons for A Least Squares Means Estimates

A	Estimate	Std Error	DF	Lower 95%	Upper 95%	Mean	Mean
a <sub>8</sub>	2.3191278	0.04891255	64	2.221414	2.4168418	2.3191278	a
a <sub>10</sub>	2.3754722	0.04891255	64	2.277758	2.4731863	2.3754722	a
a <sub>3</sub>	1.61865	0.04891255	64	1.520936	1.716364	1.61865	ab
a <sub>11</sub>	1.6679389	0.04891255	64	1.570225	1.7656529	1.6679389	ab
a <sub>13</sub>	1.7549833	0.04891255	64	1.657269	1.8526974	1.7549833	ab
a <sub>14</sub>	1.6630333	0.04891255	64	1.565319	1.7607474	1.6630333	ab
a <sub>5</sub>	1.5391222	0.04891255	64	1.441408	1.6368363	1.5391222	abc
a <sub>7</sub>	1.5271833	0.04891255	64	1.429469	1.6248974	1.5271833	abc
a <sub>2</sub>	1.0120778	0.04891255	64	0.914364	1.1097918	1.0120778	bc
a <sub>4</sub>	1.3882611	0.04891255	64	1.290547	1.4859752	1.3882611	bc
a <sub>6</sub>	1.0136722	0.04891255	64	0.915958	1.1113863	1.0136722	bc
a <sub>9</sub>	1.4524944	0.04891255	64	1.35478	1.5502085	1.4524944	bc
a <sub>12</sub>	1.4320111	0.04891255	64	1.334297	1.5297252	1.4320111	bc
a <sub>15</sub>	1.2561778	0.04891255	64	1.158464	1.3538918	1.2561778	bc
a <sub>1</sub>	0.7071	0.04891255	64	0.609386	0.804814	0.7071	c
a <sub>16</sub>	0.7071	0.04891255	64	0.609386	0.804814	0.7071	c
a <sub>17</sub>	0.7071	0.04891255	64	0.609386	0.804814	0.7071	c

**Least Squares Means Plot**

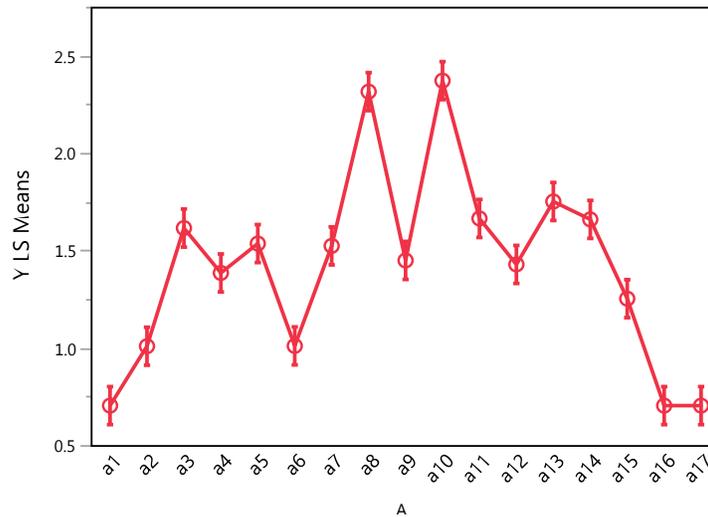


Figure 5. Infection according to cultivars

**Tukey HSD All Pairwise Comparisons**

Quantile = 3.60132, Adjusted DF = 64.0, Adjustment = Tukey

Table 13.– Multiple Comparisons for B. Least Squares Means Estimates

B	Estimate	Std Error	DF	Lower 95%	Upper 95%	Mean Estimate
b <sub>1</sub>	0.9492529	0.02054738	64	0.9082048	0.9903010	0.9492529 b
b <sub>2</sub>	1.5467206	0.02054738	64	1.5056725	1.5877687	1.5467206 a
b <sub>3</sub>	1.7642922	0.02054738	64	1.7232440	1.8053403	1.7642922 a

Quantile = 2.39943, Adjusted DF = 64.0, Adjustment = Tukey

## All Pairwise Differences

Table 14. – Tukey HSD All Pairwise Comparisons

B	-B	Difference	Std Error	t Ratio	Prob> t	Lower 95%	Upper 95%
<b>b<sub>1</sub></b>	<b>b<sub>2</sub></b>	-0.597468	0.0290584	-20.56	< 0.0001*	-0.667191	-0.527744
<b>b<sub>1</sub></b>	<b>b<sub>3</sub></b>	-0.815039	0.0290584	-28.05	< 0.0001*	-0.884763	-0.745316
<b>b<sub>2</sub></b>	<b>b<sub>3</sub></b>	-0.217572	0.0290584	-7.49	< 0.0001*	-0.287295	-0.147848

As can be seen from the tables, the soft wheat cultivars under study are more susceptible to brown leaf rust (*Puccinia triticina*) versus yellow rust (*Puccinia striiformis*).

L.V.S., Sylva and Progres cultivars have higher susceptibility to *Puccinia striiformis* than other cultivars.

Regarding yellow rust infections, we can say that the wheat cultivars in the study are resistant to this infection not only for the effect of genetic stability of the parent components in hybridization, but also for the effect of climatic conditions of Korça region, which do not favor the intensive development of this disease.

Climatic conditions, especially average air temperatures for the Korça region are more favorable for the development of brown rust infections. Among the cultivars under study, Fioco x Uniculum 547/3-2-3-4-2 possess the lowest stability. Ardenica x Uniculum 1110/3-1-3-2. Cultivars with parental components Uniculum line at the intersection, are susceptible to this rust. These cultivars pass grade III infection

Black stalk rust (*P.graminis*), is considered a malignant infection of wheat productivity.

The physiological disorders of the cell caused by this disease are higher than those caused by leaf rust due to the fact that the pustules are larger in size and dry out the wheat plant faster.

From the results we conclude that wheat cultivars are susceptible to black rust. The highest infections are in the cultivars Fioco x Uniculum

547/2-1-5-3-2, Fioco x Uniculum 547/3-2-3-4-2 and Ardenica x Uniculum 1110/3-1-3-2.

Regionalized soft wheat cultivars in the Korça region and specifically Dajti and Bulgarian cultivars 9 × VS-19/1-2-4 and Virginia x IKB6/2-3-6-3-3 are distinguished for high resistance to stalk rust. Between the three test years 2016, 2017 and 2018, we find that cultivars have not highly variable sensitivity. The study convinces us that the origin of cultivars is a test factor for resistance to leaf and stem rust.

### IV. Conclusion

- Soft wheat cultivars in the Korça region are susceptible to infections of rust on leaves and stems to the extent of 0–12%;
- Between the two forms of leaf rust, brown (*P. triticina*), and yellow (*P. striiformis*);
- Wheat phenotypes are more resistant to yellow rust for both genetic and climatic factors;
- Cultivars: Bulgarian 9 × VS-19/1-2-4 and Virginia x IKB6/2-3-6-3-3 are resistant to three pathogens, but are not regionalized, as their yields are lower;
- Dajti regionalized cultivar is evaluated with the highest resistance to both types of leaf and stem rust. This is one of the reasons for the stability of the production of this cultivar;
- Genetic susceptibility of wheat phenotypes is the most effective way to protect against rust diseases on leaves and stems.

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## Section 5. Economics and management

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### **LEGAL CHALLENGES HOST FAMILIES AND INTERNATIONAL STUDENTS WOULD FACE DURING THE EXCHANGE PROGRAM**

**Abstract.** International students who are not US citizen hold the F1 visa that allows them to enter the United States as a full-time student at a college, academic high school, elementary school. F1 visa is a nonimmigrant visa, which means the international students who have it don't have a stable home here since their family didn't move to the US. In this case, those international students need to live with a host family to guarantee their safety. The local people who volunteered to be host families often choose to offer homestays to meet with international students and it's also a great chance to get in touch with different cultures at the same time. This article listed the legal issue that could happen between host families and international students. Nonetheless, I can't give any specific solution related to law since I am a high school student right now. I am only able to point out those potential problems based on my experience during the exchange program and arouse the reader's awareness. Being far away from home without their families is already a challenge for student, therefore leading to the result that it's important for both parties to be abide by the rules when signing the contract.

**Keywords:** Legal, F1 visa, host families, international students, exchange program, challenge or problem.

As one of the international students who has studied in the United States and stayed with a host family, I am familiar with the exchange study process. International students usually don't have family with them or own a residence in the States. Therefore, it's important for them to find a place to stay while their day student peers return to their homes after school. This research paper explores the potential legal issues among the international students, guardians, and host families. So as not to mislead the readers, this article won't propose any solutions to possible legal problems because I'm not a lawyer. Instead,

I decided to discuss possible issues based on my own experiences, research, and ability to raise awareness of these matters with the public.

Host families usually are just that: a mother, father, and often, school-age children. For reference, a guardian is a person who has been appointed by a judge to take care of a minor child or incompetent adult (both called "wards") personally and/or manage that person's affairs.

The United States is considered to be a developed country, while China is the largest developing country. The U. S. is famous for its advanced educa-

tion system, which attracts students from all over the world. Since the late 1970s, the government of the People's Republic of China has encouraged international scholarly exchanges in order to accelerate modernization. After the U.S. and China agreed to exchange students in 1978, the number of students who came to study in this country increased rapidly.

Many people are unwilling to serve as host families, for numerous reasons. First, they are not sure what kind of students will be coming into their homes. Second, they are subjected to many regulations from the placement agencies that help to link host families with international students. Third, there are likely risks and challenges waiting for the host family.

The American Homestay Network (AHN) is one of the largest Homestay Hosting Networks in the United States that provides high quality homestay programs for foreign exchange students. According to AHN's website: "It incorporates decades of international experience in homestay operations management to ensure that a homestay experience is a secure, comfortable and enriching experience for both hosts and guests." Parties who use AHN or any other placement agency must enter into a contract to effectuate the exchange process.

According to [upcounsel.com](http://upcounsel.com), from a legal standpoint, the contract is a written or spoken agreement between two entities or individuals, which serves as legal protection for both parties involved in a potential business deal. A contract between the host family and the guest is an important instrument, which defines the fundamental issues in this relationship. A contract also helps to strengthen the parties' commitment and make clear to the guest that her/his room is reserved. A placement company, acting on behalf of the host, may consider charging a security deposit for the reservation and deduct the deposit from the student's first payment. A well-written contract will avoid misunderstandings and conflicts, as it outlines what the guest can expect from the host family and also what the host family should expect from the guest.

AHN implements different rules for the hosts and the students, also known as guests. According to its host contract, every host agrees to be bound by the terms and conditions when they apply to be the host family. It is also the host's responsibility to ensure that any person who may be connected to the host and stay in the home receives timely notice of the terms and conditions of this host agreement and their obligations under it.

Homestay is a way to broaden horizons because international students will be able to become acquainted with American culture. However, unfavorable issues do present themselves, and thus, legal measures may be necessary to a just resolution to potential problems.

One of the most important aspects of this legal arrangement is that of the payment structure. For instance, fees that are not usually paid directly to the host. Instead, the payment must go through the agency. This policy is stated by American Homestay Network as follows: "Hosts must not collect any fees or payments directly from Guests or any other party in respect of the Homestay." Clearly, the agency governs the relationship between host families and international students. Moreover, it plays an important role in building the bridge of communication when the guest fails to directly communicate with the host. For example, my family speaks Chinese rather than English, so they had difficulty communicating with my host family. In such a case, the agency must translate for both of them when the host speaks English only. The situation might be a little different when the host speaks the same language as the international students; sometimes, they come from the same country. When the agency fulfills its duty, such as providing protracted translation services, it is reasonable that the agency would deduct management fees from any guest payment account, transferring the remainder to the host's account.

Nonetheless, there is a possibility for dispute when the agency fails to deduct the agreed-upon amount, which means it gets more than it should,

based on the contract. Using myself as an example, when I lived with a host family this summer, my mother accidentally learned that the host family received less money than it had been promised by the agency. My mother paid \$3,700 per the contract she signed with the agency. The contract guaranteed that the host family would receive 80% of the total amount, with the remainder to be allocated as a management fee. Despite this, the host family only received \$1,700 in reality, which is not even half of the amount my family paid. My mother wants to help the host family to recoup the money they should receive, and she plans to take legal measures.

According to EF High School Programs, another contracting placement agency, it provides a welcoming and supportive home for students who need one. A host family is expected to treat the student like a family member, not a guest. However, things do not always go as smoothly as one might hope. In extreme cases, a student can be harmed by the host or a member of the family directly or indirectly. For instance, students can be harmed accidentally because unfortunate things happen all the time. Sometimes, negligence on the part of the host family might be involved. For instance, when I was living in my classmate's house this past summer, the host mother asked me to carry six heavy boxes for her. I might have injured myself, as after carrying the boxes, I felt severe muscle pain. I also ended up feeling much pain around my ribs; they hurt so much that I was unable to fall asleep. When I mentioned this to the host mother, she was indifferent, telling me that I was too weak, because the boxes were not that heavy. This seemed quite disrespectful when she didn't even participate in moving the boxes. Even though she didn't hurt me, I was harmed by the activity she asked me to undertake, and this happened in her house. It should be her responsibility to be in charge of my safety if I am a resident in her house, especially since at the time, I was a minor. The typical age of attaining legal adulthood is 18, which means students who are below this age is still not

fully independent. A host family who plays the role of a responsible adult or guardian must provide help when the students need it.

Besides the concern of students becoming victims of potential harm, there is also the possibility that the host family can be harmed in a similar way, or, in the most extreme cases, in an even more disturbing manner. On October 25, 2020, at 7:15 p.m. on a seemingly normal Thursday evening in suburban Auburn, Alabama, the police received a report of an attack. When they responded to the scene, officers found two victims with multiple fatal stab wounds on their bodies. In this most tragic accident, a 21-year-old college student from China killed the father of the host family, and the mother was critically injured. The college student forced his way into the victims' home and eventually stabbed one of them into death. Police have not provided other details so far but what we know is that the student was charged with two counts of murder and one of attempted murder. Now he is being held without bail in a local jail. There had been considerable animosity building between the two sides, but nobody expected this to happen. People who are familiar with this sad story wonder if a simple dispute is to blame, or perhaps there was a mismatch of personalities in the placement process.

It appears, however, that there is a deeper truth behind the accident. Based on published sources, the dispute between the college student and his host family mother began earlier the same year, in May. The two often quarreled in social media group chats. Apparently, the mother began posting derogatory comments about the student publicly after he damaged a bed in her house. (Why a grown woman found it necessary to use this forum to incite hatred toward a foreign youth is a different question). This boy suffered a great deal from the offending comments and unfair treatment he received from his host family. Moreover, this current year has presented unusual challenges for everybody. Covid-19 has made it impossible for many international students to go back home due to the lengthy quarantine periods.

Given the exceptional circumstances, those involved in exchange arrangements should try harder to expend positive energy.

Specifically, regarding the 21-year-old Chinese student who undertook this most extreme and unfortunate course of action, it has also been reported that he was told by his host family mother that he was free to move about the community after he quarantined for two weeks. However, one day, after he returned home from a walk, his host mother informed that he should walk in the woods, hidden from people, because the neighbors would be afraid of him because he was wearing a face mask. Both sides of this situation must be weighed. On the one hand, it was reasonable for the host mother to insist that the student respect local quarantine regulations. On the other, it could have appeared insensitive that she appeared to care more about her neighbors' perceptions than the sensitivities of the visiting student, who was, after all, a guest from a faraway place. Even though he was irritated and confused when he was seemingly not respected by the host family, the extreme action he undertook is still highly and obviously inappropriate. Impulse and violence make everything worse and serve no purpose. From my perspective, when something happens that no individual effort can change, we have to learn to accept the situation and move forward. Since this boy murdered someone, which is considered the worst kind of harm possible, a criminal legal standard was properly applied, and police intervention was necessitated.

The boy in question was actually already an adult, since he had turned 21. As such, he could even be subject to the death penalty in some jurisdictions. This tragedy might have been avoided, but it seems that this was a case of "the last straw" having been pulled. The student intended to harm the host family to avenge his misfortunes. However, this is an enormously heavy price to pay for both parties. The host family will suffer lifelong despair as a result of this tragedy, and the student will be in jail for the rest of his life, or worse. He could have had a meaningful life doing the things

he enjoys and serving society in productive ways. But this did not happen. He destroyed his own life and the lives of every member of his host family.

First-degree murder is the most serious of all homicide offenses. In most states, first degree murder is defined as an unlawful killing that involves any intentional murder that is willful and premeditated with malice aforethought. Even though first-degree murder laws vary in different states, it is a very serious crime in every state. A conviction of first-degree murder can result in an extremely long prison sentence and sometimes even the death penalty. Most states retain the death penalty as an option for those convicted of their highest-level murder offense. States vary in terms of how often prosecutors seek the death penalty, and also whether their top-level murder convictions require the death penalty. For example, Texas imposes death sentences on all those convicted of capital murder, its highest-level murder charge. In California, on the other hand, aggravated first-degree murder can draw either the death penalty or life in prison without parole. Second-degree murder is generally described as the unpremeditated intentional killing of another. Typically, it is defined as murder that is caused by the offender's reckless conduct that displays an obvious lack of concern for human life. Basically, both first-degree and second-degree murders are intentional while third-degree murder is referred to as manslaughter. This can be confusing because it's a lesser charge than first-degree murder, but more serious than simple manslaughter. Second-degree murder typically involves jail time and can in some serious cases lead to a life sentence. Third-degree murder is a category of murder defined in the laws of states, such as Florida, Pennsylvania and Minnesota. According to Minnesota criminal statute 609.195 (third degree murder), it carries a maximum 25-year jail sentence, a fine up to four thousand dollars or both. However, the state's sentencing guidelines normally recommend twelve and half years for a conviction on the murder charge and four years for manslaughter.

In the case discussed here, the 21-year-old college boy is currently in the jail and waits there for his trial. Under Alabama law regarding criminal procedure, and unless otherwise provided in the Alabama Code, the prosecution of all misdemeanors in a circuit or district court must be commenced within 12 months after the commission of the offense, but as this case is a felony, the wait for trial is longer than that, and in most states, can take years. It should be remembered that this boy, now an accused murderer, awaits trial in a jail thousands of miles away from his home, without the support of family members who are unable to visit him in custody, in contrast to most other inmates. The fact that all of this resulted from an ill-fated exchange program arrangement, entered into by parties on both sides who were clearly unprepared for the consequences of such a situation, is a tragedy.

Fortunately, although there is no shortage of accounts of unfortunate events, the vast majority do not rise to this level of severity or legal consequences. The way parties on both sides approach the arrangement may affect the outcomes of potential situations that may arise. The best way to do this is to think about things that can go wrong. Many of these can arise in the form of negligence, which is a broad concept in the area of civil law.

According to the Legal Information Institute, negligent conduct may consist of either an act, or an omission to act when there is a duty to do so. The main factors to consider in determining whether a person's actions lacked reasonable care are the foreseeable likelihood that the person's actions resulted in an injury, the foreseeable severity of any injury that might occur, and the burden of preventive measures to eliminate or reduce the risk of injury. In law, failure to meet standards of conduct established to protect society from unreasonable risk constitutes a form of negligence. Negligence is the cornerstone of tort liability and the key factor in most cases of personal injury and property damage. (A tort is basically a wrongful act.)

Negligence can cause many problems, and accidents are likely the most common sources of trouble.

The accidents that can possibly happen in any residence include falling down the stairs, suffering burns from cooking or excessively hot water (poor plumbing), electrocution/injuries from faulty wiring, attacks by biting pets, suffering skin irritation or illness from biting pests such as fleas or bedbugs, slipping and tripping on defective flooring or carpets, becoming injured by sharp objects or surfaces, suffering from carbon monoxide poisoning, or even suffering allergic reactions to pet dander or other household irritants. The list can go on and on, and the items mentioned are only those that occur inside of the house. It is possible that potential injuries or accidents that occur outside of the house can be even worse, since things like cars, motorcycles, mowers, ATVs, or bicycles could become involved. Any of these could cause a serious accident. All of these acts, which fall under the larger legal category of negligence, are divided into harm unintentionally caused to one's self (often known as "contributory negligence" in legal terms), and harm unintentionally caused to others (commonly defined as "torts" in legal terms).

Who is responsible if somebody is hurt in an accident? This can be a far less simple issue than it would first appear to be. For instance, it would seem that a host family is responsible if a student guest fell down a staircase that had loose carpeting. But what if that same student had taken liquor from the household supply, without asking permission, and become intoxicated when they were standing atop the stairs? Likewise, the situation of a dog bite seems to be entirely the responsibility of the host family, for their failure to control a dangerous animal. But again – what if the student guest provoked the animal repeatedly, teasing or even harming it? In another example, a student guest could become injured in the host family's automobile, but what if the student was the one who drove the car, without permission? In yet another twist, what would happen if the student guest became injured while operating machinery in an improper way, but they were operating the machinery at the request of someone in the host family?

Students and host families should think about all of these potential situations, often with legal consequences, before entering into hosting agreements.

In this context, a discussion of household rules is inevitable. Even if the parties do contemplate all of these things and try to fix problems before they can happen, it seems clear that everybody needs to be aware of the rules before they enter into a living arrangement with each other.

Sometimes, trouble can arise in unexpected ways, like trouble at mealtimes. It's a hard decision for a Chinese family to let their child study abroad by themselves at a young age. For students who study here, our priority is the schoolwork. To have energy to study at a high level, it's necessary to get sufficient nutrition. Otherwise, we will lack the power to learn and focus. To use myself as an example, when I was in the eighth grade, my first host family gave me and the other girl who lived in their home mostly instant noodles for dinner. For breakfast, it was always cereal and milk, with only a sandwich with a piece of ham for lunch. I wasn't starving because at least I had three meals every day. However, I didn't feel there was enough nutrition to support my body, not to mention that instant noodles can make people sick when eating too much of them. Children's health and safety are the most important things to parents, so my mother was quite concerned about my nightly diet of instant noodles, since she considered them unhealthy food. The contract my mother signed with the host contracting agency guaranteed a variety of healthy food, to be supplied by the host family. In accord with her legal requirements under the contract, my mother paid a lot of money for me to get a good quality of diet; however, the host family did not abide by their portion of the contract. They failed to provide adequate nutritional food as they had promised to do by signing the contract. The existence of the contract is supposed to help things go smoother by making sure both sides follow the rules. Instead, when unexpected things happen be-

cause people don't adhere to the rules, the contract loses its original meaning. Once a contract has been broken, legal consequences can and often do follow.

According to the AHN host family code of conduct, providing adequate food for the student guests means preparing healthy meals in accordance with the agreed-upon meal plan detailed in the placement report, with at least one meal per day consisting of meat or other protein, vegetables and rice or noodles. In such a case, student guests are assured to have adequate nutrition. There is a reason for this provision of the contract: adolescents consume lots of energy when studying in classes and doing exercises; therefore, we deserve to have healthy meals. Host families need to be aware of the importance of diet and how much their actions in this regard can impact the students.

A huge obstacle for someone like my mother, who seeks to recover damages for losses incurred as the result of a violation of a hosting agreement, is the question of where to take such measures. It is not readily apparent in what legal forum a foreign citizen who suffered a monetary loss that originated in the United States can seek to recover damages. Would such a case be heard in a federal court? A state court? A local court, and if so, which one – a county, town, village, small claims, or other court? Even though my mother is identified as a Chinese rather than American citizen, she has the right to sue people in the local court, which means she could bring the agency to small claims court due to the violation of the hosting agreement. Over the years, the right of a non-citizen to file a lawsuit has been expanded include lawsuits filed in state courts. However, in a state court proceeding involving national diversity, either party can request that the case be transferred to federal court.

Is it also possible that the dispute could only be resolved in a foreign court, because that is where the claim arose? If this happens, how would it be fair or even possible for the U.S.-based defendant to even respond? What legal papers would need to be filed, and how and where? If it was found that she was owed money damages, how would the proceeds be paid? In a domestic

court? Would they be wired to China or to some other place? Would an average neighborhood lawyer be able to advise someone like my mother? Who would know how to tell her what she should do? Would anybody know? Also, as a non-native speaker, there will be language problems for her since she might not understand the whole process when everyone around her speaks English. The domestic court should probably order payment of the proceeds since the problem happened in the United States; however, it's more convenient if my mother receives money if the case is moved to China. Because the amount of damage is limited based on how much she paid according to a simple contract, the average lawyer should know what to do or at least offer her helpful advice.

There is still one more area to consider, and that is the matter of third parties who may enter the household. It should not be forgotten that they can cause harm to the student, or the student could potentially put such individuals in danger too. For instance, there are deliverymen who place people's packages. As strangers who aren't part of the host family but do come to their house, there is a potential that a student guest could be in an unsafe circumstance. Some other possible situations include harm from relatives or neighbors of the host family when they come to visit. The unwanted conduct can be as severe as abuse, or it may merely count as teasing from an adult to a child. This situation could also expand to include a much larger number of third parties that the student could potentially come into

contact with as a result of their relationship to the host; these include workers such as painters, plumbers, electricians, or repairmen; clergymen in a house of religious worship attended by the host family; and medical service providers who visit the home, like speech or occupational therapists. This is obviously another area that could result in potential legal trouble, and people should think carefully about it before they enter into a hosting arrangement.

The students who are under age 18 are still protected by law. They deserve to be treated respectfully and it's significant to be aware that they are vulnerable compared to adults. To make things more equal, an objective standard should be applied to allow the student to dictate the terms. As long as people are involved in a dispute, they should all be heard, no matter their ages. It's not fair if one chooses to listen to adults only because they seem to be more trustworthy. When a case is not known completely, it cannot be fully judged. The plaintiff and the defendant have a right to speak in court; therefore, the judge can make a valid decision

Everything becomes harder when we are far away from home because our parents, living and working in China, are not able to help no matter how awful the things that happen to their faraway children might be. This already stressful situation can be improved with sufficient preparation, and asking simple questions, such as whether either party understands the risks involved, and if they are ready to enter into such a delicate arrangement.

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