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Studies on the effect of wheat rust research control and progress in rust disease management in India.

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Abstract

All over the world wheat portion on an area of inure than 219 million hectors with a production of 763-2 million tons. With the burgeoning population, requirement for food with increase, India alone will need more than 140 million tons of wheat by 2050 to feed as estimated population of 1.73 billon with the intensification of agriculture, post and pathogen incidences and increasing. New biotic threats like Ug99 of stem rusts virulence for resistance gene yr9 in the strip rust pathogen, and the new threat of wheat blast have immerged, to sustain and increase the wheat induction, reducing the impact of biota and biotic stresses on production with be critical.

Key-words :- Efficiently, Cultivation, Yield, Micronutrient,Virulence, A. triticina, Pathogen.

Introduction

The modern wheat crop is the staple food of millions of people and its origins can be & traced back almost 10,000 years. Wheat is the Staple food of millions of people, being one of the three globally produced cereals like Maize, Barely, Rice etc. At though rice is the second largest produced cereals in the world its production is 10 closed to western and eastern Asia. The cultivation of wheat was started some 10,000 years ago, with its origin being traced back to south east turkey It was called Einkorn (T. monocoeeum) and genetically is described as diploid, containing two sets of chromosomes. AT a similar time Emmer wheat (Titmice dicoccum) was being domesticated.

This was a further genetic development as Emmer was a natural hybridization between two world grasses triticum urartu (closely related the wild einkorn (T.boeoticum), and an Aegilops species. Both of these were diploids which meant that this new wheat was new a tetraploid, i.e, it had for four sets of chromosomes. Durum wheat is also a triploid and developed through a hatred hybridization just as Emmer wheat dial over the years formers continued to make sections from their field of wheat's that showed favorable traits-ease of harvest, yield etc. And new wheat started to dominate spelt and common bread wheat became the favored types. These two

were again the result of natural's hybridization between Emmer wheat and the wild goat-grass Azeglio's tauscher. This hybridization took the tetraploid to an hexaploid, now containing six sets of chromosomes. Some what different to the 14 in the original species. This natural' genetic development, whilst being highway successful, has taken many years so biotechnology in how exploring the ways that genetic makgement can be done faster and move efficiently with very targeted gene manipulation.

Principles of wheat agronomic

The agronomic principal behind wheat production is to first build as efficient least canopy and than keep-this photosynthetically for as long as possible through to harvest. An effective crop nutrition programme is necessary to achieve both of these objectives.

The objective of crop production is the convert photosynthetically Active Radiation (PAR) into any matter that can then be utilize in the form of nutrition food animal feed or feedstock for energy production.

Production of wheat word wide

Wheat is an important cereals crops to human kind as it is a staple of many diets around the world. A Cording to IAOSTAT, china produces move wheat than any other country, followed by India, Russia, and the United States, Here is an overview of the world's top ten wheat producing countries.

Rank-01 CHINA

China is one of the largest producer of wheat and plays an important role in shopping grain market dynamics across the word. Around 126 million metric tones of wheat are produced my the country per years on a land area 24 millions hectares China consumes 40% 7 the grains in the country. It is cultivate extensively in the yellow river and Huai valleys of China, where the crop is ratated with maize where as along and around the Yangtze river valley, It is instead more commonly rotated with rive.

Rank	Country	production in 2019-2020
1	China	134,340,630 Tones
2	India	98,510,000 Tones
3	Russia	85,863,132 Tones
4	USA	47,370880 Tones
5	France	36,924,938 Tones
6	Australia	31,818,744 Tones
7	Canada	29,984,200 Tones
8	Pakistan	26,674,000 Tones

Loss of production due to fungal disease –

Wheat, an important credits crops is cultivated word wide and is second highest in production just after maize, due to the increasing world population, these is need for a 40% increase in wheat production to meet global food requirements. Wheat production in diminished mainly by biotic and biotic stresses all over the word, of these, pathologically disease are the most important activity factor of wheat production as different pathogens' infect wheat plants, causing severe losses in field and quality wheat can be infected by biographic fungi, necrophytic species and nematodes, as well as viruses and bacteria. Among these different fungal disease are the most prominent and pose a great challenge to wheat production. Development of resistant varieties is the only solution to overcome this problem and the attain the required wheat production. The development of resistant vanities has benefited immensely of from the use of molecular markers, genetic maps physical maps, QTL analysis and mark assisted section, however, we have to develop multi disease resistant naiveties to fulfill the demand for wheat globally. This review highlights some major fungal diseases of wheat in different parts of the word and the associated problems.

In Bihar

In Bihar production of the crops is 59.89 millions tones and 21.06 millions heaters in 2016-17. Directorate of economics & Evaluation Department, Govt. of Bihar. It is observed an inexpressive rate of growth in Bihar. During few decades meows June 2018

A/c to ICAR Bihar is potentially an important wheat growing state that can tributes 5.7% towards national production from 8% of wheat growing area of the country with a low productivity of I. a tones the. The yield gap between formers fields and frontline demonstration is about 1.2 tonnestha the area, production and productivity averaged over last five years are 2.1 million ha, 4 million tones I ha respectively. The major constraints in production are low seed replacement rates, late showing low forms mechanization and foliar blight disease, leaf blight of alter navigate reticent disease, suitable technological interventions are –

1. **Improved varieties**

   Irrigated lamely sown: K 9109, HD 2733, HP 2824, HP 1761, PBW 443, HUw 468, K 9107, NW 1012, UP 262

Cultivation area in India:

The total area under India wheat is soft/medium hard, medium crowps is grown about 29.8

Nutrition Value of wheat flour, whole grain

Nutrition facts

Serving Size_____100 gms

Amount Per serving _____340 calories.

Amount % daily value

Total fat _____ 2.5 g ___3%

Saturated fat _____ 0.4 gm __2%

Sodium_____ 2mg ___0%

Total carbohydrate_____72gm__26%

Dietary fiber _____ 11g ___39%

Sugar_____ 0.4g----0.6g

Protein_____13gm__26%

Vitamin D_____0.00meg__0%

Calcium_____34.00mg__3%

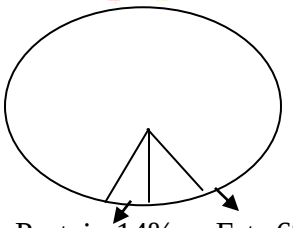
Iron_____ 3.60mg___20%

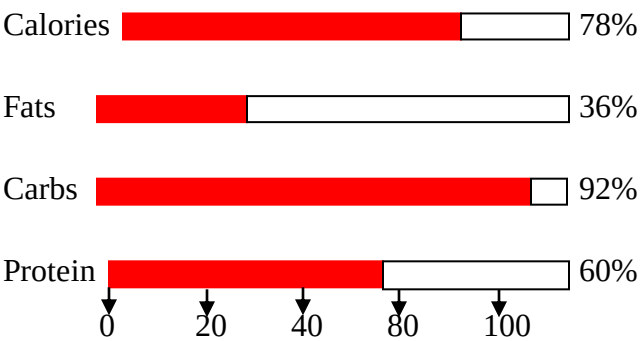
Potassium_____363mg__8%

Note – The daily value (DV tells you low much a nutrient in a serving of contribute to daily diet. claries a day is used for general nutrition advice.

Calories by source :

Crabs 80 % _____





Wheat flour, whole grain nutrition facts and analysis per serving.

Nutrient	72.8 mg
Choline	31.2mg
folate	44.00 meg
Folic acid	0.00 meg
Niacin	4.957 mg 31%
Pantothenic acid	0.603 mg 12%
Riboflavin	0.165 – 13%
Thiamin	0.502 mg 42%
Vitamin A	9.00 IU-0%
Vitamin A RAE	0.00mgg
Carotene alpha	0.00 mg
Carotene beta	5.00 mg
Cryptoxanthinbeta	0.00mg
Lutein+Zeaxanthin	220.00mg
Lycopene	0.00 mg
Vitamin B 12	0.00 mg
Vitamin B 12 added	0.00mg 0%
Vitamin B6	0.407mg 31%
Vitamin C	0.00mg 0%
Vitamin D	0.00mg
Vitamin E	0.71 mg 3%
Tocopherololpha	0.71 mg
Tocopherol beta	0.23mg
Tecopherol gamma	1.91 mg
Tocotrierol alpha	0.30 mg
Tocotrienrol gamma	0.03 mg
Vitamin K	1.9 mcg 2%

Minerals

Calcium, - Ca	34.00 mg 3%
Copper, cu	0.410 mg 46%
Fron-,fe	3.60 mg 20%
Magnesium, mg	137.00 mg 34%
Manganesh, mg	4.067 mg 177%

Phoshorur,p	357.00 mg 51%	
Potassium, se	363.00 mg 8%	
Selenium se	61.8 mg 112%	
Sodium, Na	2.00 mg 0%	
Zine, zn	2.6 mg 24%	

Protein and amino lids :-

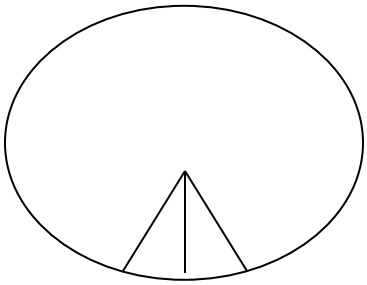
Nutrient	Amount	Dv.
Protein	13.21 g	26%
Alanine	0.489 g	
Arganine	6.648 g	
Aspartic acid	0.722g	
cystine	0.275g	
Glutamic acid	4.328 g	
Isoleucine	0.443g	32%
Leucine	0.898g	33%
Lysine	0.59 g	17%
Methionine	0.228 g	22%
phenylalanine	0.682 g	39%
Proline	2.075g	
Serine	0.620 g	
Threonine	0.367g	35%
Tryptophan	0.174 g	62%
Tryosine	0.275 g	16%
Valine	0.564 g	31%

Carbohydrates

Nutrient	Amount	Dv.
Carbohydrate	71.97 g	26%
Fiber	10.7 g	38%
Sugars	0.41 g	
Practice	0.05 g	
Glucose (dextrose)	0.00 g	
Starch	57.77g	
Sucrose	0.36 g	

Fats & fatly acids

Fatly acid by types-Polyunsaturated 62%



Monona Saturated 15% Saturated 23%

Nutrient	Amount	Dv.
Fat	2.50 g	3%
Saturated fatty acids	0.430 g	2%
Heyadecenoic acid	0.410 g	
Octadecenoic acid	0.620 g	
Monounsaturated fatly acid	0.283 g	
Eicosenoic acid	0.010g	
Octadecenoic acid	0.273 g	
Phylum saturated fatly acid	1.167g	
Octadecatrienoic acid	1.093 g	
Octadecatrienoic acid	0.073g	

Sterds

Nutrient	Amount	Dv.
Cholesterol	0.00 mg	0%

Other

Nutrient	Amount	Dv.
Hohhot, empty	0.0 g	
Ask	1.58 g	
Water	10.74 g	

Food related the wheat flour whole grain –

Wheat flour,	Tritical flour
Soft wheat,	Whole grain
Whole grain,	Corn flour
Sorghum,	White whole grain
Flour, whole,	
Grain	

Result

In above mention shows Nutrition fats for wheat flour, whole grain, recommended daily values and analysis. Daily Values are based on 2000 calories diet and 155 ibs body weight (Change) Actual daily nutrient requirements might be different based on your age gender, loved or physical activity, medical history and factors. All above date is why for general informational purpose. Flo contacted your doctor advice to change your own requirements of diet.

Best Varieties of wheat

Hi 8759 (Puja Tejas) – If is a high yielding durum wheat variety with an average yield of 75.5th/ha and potential yield of 7.6t/ha.

It is a dual purpose vanity suitable for making chapatti, pasta and other traditional food products along with high protein content (12%) B- Carotene (5.7 PPM less gruel solid loss. high overall acceptability (7.5) and essential micronutrients like iron (42.1 PPM) and zone (42.8 PPM)

Materials

HD 4728 (Pusa Malawi)

The variety that gives an average yield of 5.42 t/ha with maximum genets potential of 618 t/ha. A durum wheat variety released and notified for the timely sown irrigated condition of central zone comprising Madhya Pradesh, Chhattisgarh, Gujarat, kota and Udaipur diseur of Rajasthan and Jhansi division of utter Pradesh. This is a semi dwarf variety (90 cons having high tailoring capacity, 120 days maturity duration with the high degree of resistance to loaf and stars rusts. The variety posse somber colored lustrous bold grains (48.3g/1000 kernels) and superior quality traits for end-use in seminal-based industries.

HW 5207 (cow3)

The Variety is known for processing the gene Lr24+Sr2 and Yr15 for conferring high degree of resistance to leat, stem and yellow rusts. It was released from Tamilnadu State. The variety gave an average yield of 4.08 t/ha suited for short winter conditions of Tamilnadu.

HS 562 :-

This variety is known for having good chapatti score (7.6) and bread making qualities. It is also known for its micronutrient contents like iron (38.4 PPM) and zone (34.5PPM). It has a combination of rust resistance genes (Yr A+, Lr23, Sr8a+Sr8b) to combat rust pathogens. It's a high yielding wheat variety, with an average grain yield of 3.6t/ha under rain fed and 5.2 t/ha under irrigated condition of northern it ills zone. It was released and whiffed by central sub. Committee on crop standards. Notification and released varieties for agricultural crops.

HD 3171

The varieties is mostly known for its resistance to yellow, brown and black rusts both under natural and artificial epiphytotic conditions during three years of testing the resistance base in HD 3171 for yellow rust is postulated on the basis of it unknown resistance gene and for brown rust. It is based on slow rusting gene, Lr13 along with Lr10. It is a high yielding wheat variety with an average yield 2.81 t/ha, was released for. Commercial citation under rain fed conditions of North eastern plains zone by central sub committal on crop standup notification and release of variants for agricultural crops.

HD 1605 (Pusa Ujala)

The Variety is famous its ability of resistance to black and brown rusts and also has good level of, resistance to flag smut karnal bunt leaf blight and foot rot disease stays excellent chapatti making quality, good sedimentation value (-55 Ml) high protein (-13%) and high amount of micronutrient like iron (43 PPM) and zone (35 PPM). It is high yielding bread wheat variety. Hi 1605 with an average yield of 73.0 t/ha and potential yield up 4-4 t/ha under timely sown. Restricted irrigation condition of pain solar zone, was released by central subcommittee on crop standards. Notification released of varieties for agriculture crops. The variety is medium structured. Lodging tolerant and natures in 105 to 110 days.

Note: The seed of the above mentioned weds varieties can be obtained from the India agriculture released institute puja, now pelvic

Conclusion

All over the world wheat portion on an area of more than 219 million hectors with a production of 763-2 million tons. With the burgeoning population, requirement for food with increase, India alone will need more than 140 million tons of wheat by 2050 to feed as estimated population of 1.73 billon with the intensification of agriculture, post and pathogen incidences and increasing. New biotic threats like Ug99 of stem rusts virulence for resistance gene yr9 in the strip rust pathogen, and the new threat of wheat blast have immerged, to sustain and increase the wheat induction, reducing the impact of biota and biotic stresses on production with be critical.

Though many biotic stresses impede wheat production the wheat rust disease are best known for their divesting and vide spread nature. Both stem rust and strip rust can cause 100% in India stripe rust of wheat (caused by Puccini stir formic (sp. critic west end. Authentic is a threat in 10 million hectares of Northern Indian, where as stem rust (caused by P. gremmies rust. SP. tititici Erik & Henn.) threatens aloud 7 million heaters of control and peninsular India? contrast, leat rust)caused by P. Titicina Erik & Authority) is prevalent where ever wheat is grown in India, about 10 millions tone of wheat is saved every year through the successful management of wheat rusts. However the rust the successful management of wheat rusts. However the rusts pathogens continuo affect production through the occurrence of new virulence's that have led to the discontinuance of important wheat cultivars. For example, The emergence of virulence for Yr 9 in P.Striformis in India led to the elimination of PBW 343, a mega variety. Such changes in the virulence's patters of wheat rust pathogens the threat they pose to global wheat production.

Wheat growing cave of India.

History and current status of wheat Released in India.

Wheat is grown under diverse climatic condition in India started around 1922, with earliest pathogen identification being document in 1931. The basic objection of the research conducted were wheat rusts surveillance, indemnification of rust resistance sources is wheat that led to breeding for rust resistance over the years research activity on rust have changes that have arisen due to virulence shit in rust pathogen population in current research efforts emphasis is laid on the regular monitoring pathogen of wheat rust pathogen the use of NILS in the identification of pathogen evolution of rust resistance in germ plasma pre-emptive breeding for rust resistance and the star development of wheat varieties with diverse rust resistances in addition research activity were initiated targeting the pyramiding of rust resistance genes investigating genetic variability among wheat rust pathogen genome sequencing of wheat rust pathogens molecular studies of host pathogen interactions and revisiting the epidemiology of wheat rust pathogens.

Monitoring of wheat in our country

Though monitoring of wheat rust in India began in the 1920, systematic monitoring of wheat rusts began around 1967. Wheat disease trap plot nurseries have been planted since then the monitor the occurrence of wheat disease in different parts of India allowing the occurrence and migration pathways of the wheat pathogens and in particular the rusts to be determined. This was extended to neighboring courtiers through the establishment of another nursery comprising wheat lines from south Asian Association for Regional Co-operation (SAARC) nations that is planted in neighboring countries also.

Management of wheat rust in India.

Wheat is cultivated on about millions hectares in India. As wide variety of wheat's including bread durum and gonococcus are grown. Owing to variable climate condition for growing wheat all the wheat rust pathogens are prevalent in India. In spite of all the above facts, wheat rust have been contained successfully for the last 47 years, while wheat production has kept on growing linearly reaching 102 million tons work and there has been & saving of lo million tons every year through successful management of wheat rusts. More over chemicals flow ion infection.

A vigil is kept on the occurring of wheat rusts in India through the collaborative and coordinated effects of wheat workers. Pathogen mapping and screening for rust resistance is regular feature of the India wheat. Programmed with the activities undertaken at India wheat and barley research Institute, regional station, flower dale, Shamble himachal Pradesh. The centre has collection of 145 pathogens of different rusts pathogen and is responsible for providing the mice's and buck

inoculate for different reseated central use where in India. The main strategy has been to deploy wheat varieties with diverse rust resistance by using the pathogen distribution data skillfully. A combination of all stages resistance slow rusting and APR (rule specific and non race specific types) is used Anticipation rust resistance breeding has always been the backbone effort of the wheat programme. An emphasis is laid on the diversity of the wheat varieties grown in as area. A challenge is posed by the cultivation of mega varieties over a large are erg PBW 343 when PBW 343 susceptible to striate rust it was replaced expedition sly with many varieties within three years. This was possible because a number of choices for wheat varieties were available for farmers. Wheat rust management in India has been a model decision support system in management of disease in agriculture. Phytochemical are also the best option to use by farmer to maximum gain in production and resists of rust disease specially leaf blight pathogen *(Alternaria triticina*) of wheat in India.

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