которые ранее были способны обеспечить контроль над болезнями. Потери урожая, вызванные почвенными грибковыми патогенами, считаются серьезной проблемой для мелких производителей зерна во всем мире. Такие патогены, как *Fusarium culmorum, F. pseudograminearum, F. avenaceum, Bipolaris sorokiniana, Gaeumannomyces graminis и Rhizoctonia solania*, являются причиной за снижение урожайности пшеницы. Взаимодействие между *Heterodera avenae* и *Fusarium culmorum* на компоненты роста и урожайности твердой пшеницы сорта. *Sham 3*, размножение *H. avenae* и степень тяжести гнили кроны изучались в эксперименте. Снижение урожайности зерна, вызванное обработкой только *H. avenae* и *F. culmorum*, составило 12,3 и 25,5% соответственно. Одновременная инокуляция *H. avenae* и *F. culmorum* привела к снижению на 38,4%, что указывает на аддитивный эффект потерь урожая из-за двух патогенов.

UDC 632.651
Amangeldi N. [1], PhD doctor
Amangeldikyzy Z. [2], PhD doctor
Yerezhepova A.Sh.[1], master of chemical science
Argynbaeva Z.M.[1], master of chemical science
[1]Kazakh National Women's Pedagogical University, 99 Aiteke Bi Street, Almaty, 050040,Kazakhstan
[2] Zhangir Khan University, Zhangir Khan Street, 51, Uralsk, 090000, Kazakhstan

SURVEYING WHEAT GROWING AREA IN KAZAKHSTAN FOR PLANT PARASITIC NEMATODES WITH A MAIN FOCUS ON THE CEREAL CYST AND ROOT LESION NEMATODES

Abstract

Nematodes - one of the most abundant and widespread of multicellular animals on our planet: they account for about 4/5 of the entire biodiversity of the animal world! Representatives of about half of the species of nematodes are found in the soil or in water, but others lead a parasitic life, presenting a big problem for agriculture. Conducting surveys in the major cereal crop growing areas of Northern Kazakhstan – Shortandy, at A.I.Baraev research centre was taken 90 soil samples, by the result was the first time found 24 cyst forming nematodes, in western Kazakhstan, Uralsk experimental station was taken 90 soil samples, found 9 cyst forming nematodes in the South - Eastern Kazakhstan, Kaskelen research development stations were taken 90 soil samples of the soil samples was found 150 cyst forming nematodes. *Heterodera spp* - for microscopic identifications intercepted nematodes, the following types of parasitic nematodes have been identified. From wheat growing areas of west and south – east part of Kazakhstan was taken 180 soil samples from both regions, by doing microscopically identification from 64 soil samples we found free living nematodes and plant parasite nematodes. Performing microscopic identification of intercepted nematodes, the following species of plant parasitic nematodes were identified – *Aphelenchus spp* – 260 pieces, *Aphelenchoides spp* – 290 pieces, *Tylenchus spp* – 50 pieces , *Filenchus spp* 30 pieces, *Pratylenchus spp* - 30 pieces, *Parapratylenchus spp* – 10 pieces, *Ditylenchus spp* – 100 pieces at the province of Ural; also at the province of Almaty were identified - *Aphelenchus spp* – 303 pieces, *Aphelenchoides spp* – 570 pieces, *Tylenchus spp* – 110 pieces, *Filenchus spp* – 30 pieces, *Pratylenchus spp* – 170 pieces, *Parapratylenchus spp* – 90 piesec, *Ditylenchus spp* – 90 pieces.

Key words: *plant parasitic nematodes, cyst forming nematodes, cereal crops, spreading, wheat.*

Nematodes, or roundworms, - one of the most abundant and widespread of multicellular animals on our planet: they account for about 4/5 of the entire biodiversity of the animal world! Representatives of about half of the species of nematodes are found in the soil or in water, but others lead a parasitic life, presenting a big problem for agriculture [1].

Nematodes are the second group of species diversity after the animal kingdom insects. Plant parasitic nematodes morphologically differ little from each other, except that the size (0.5 to 5.0 mm).

The worm-like body of nematode larvae is specially adapted to move along the soil capillaries or the intercellular space of plant tissue. Cyst nematodes induce the formation of nodules (Gauls); foliar nematodes often form a mosaic on the leaves caused by death of part of the cell between the leaf veins; migratory parasites can stimulate root "bearded" root, is the formation of a large number of small lateral root branching.; nematode-carriers of viruses infect plants by specific viruses which, in turn, cause chlorosis of leaves [2].

Cereal cyst nematodes (CCN) are a global economic problem for cereal production. *Heterodera filipjevi* is one of the most commonly identified and widespread CCN species found in many wheat production regions of the world.

Materials and methods. Sample selection. Sampling is carried out at regular intervals along 1-2 diagonals of the site and on separate lanes. Within the stripes it is also possible to advance in a zigzag manner and take random samples. In a number of cases, for example, when taking samples from micro-foci of seedling damage [3].

Extraction by using Sieving method. Special methods are developed for extracting cysts, because their size, shape, and weight differ a lot from other nematode stages. Distinction can be made between extractions from wet or dry soil, also referred to as ‘wet’ or ‘dry’ extraction in short. ‘Dry’ extraction is based on the fact that dried cysts (usually) float on water because they contain an air bubble. As a consequence, (half) empty cysts are detected more frequently, which results in an underestimation of the population. After extraction, the remainder of the sample often needs to be further cleaned, because it still consists of high amounts of organic matter [4].

Research results. By doing survey some main wheat growing areas (South Kazakhstan – Almaty region, East Kazakhstan – Ural, North Kazakhstan – province Shortandy) was taken 270 soil samples. As a result, was found 27 cyst nematodes from 90 siol samples at province of Shortandy. By microscopic identifies, plant parasitic nematodes were identified – *Heterodera spp*. The results were given on the table - 1,2,3.

Table 1 – Distribution of cyst nematodes in some fields of Shortandy region

№ sample	CNAME	OC	ORIGINATOR	Place of swoing	CCN
1	2	3	4	5	6
1	SERI			Astana	1
2	LUTESTSENS2	KAZ	KARABALYK ARS	Astana	1
3	FITON-C-54SB	KAZ	FITON-CIMMYT	Astana	1
4	EKADA148	KAZ	FITON-EKADA	Astana	1
5	SHORTANDINSKAYA2012	KAZ	SHORTANDY ARI	Astana	1
6	TSELINNAYA 3S	KAZ	SHORTANDY ARI	Astana	1
7	ASTANA	KAZ	SHORTANDY ARI	Astana	1
8	LUTESCENS29-12	RUS	OMGAU	Astana	1
9	LUTESCENS106-11	RUS	OMGAU	Astana	1
10	LUTESCENS89-06	RUS	OMGAU	Astana	2
11	SEREBRISTAYA	RUS	SIB ARI	Astana	1
12	LUTESTSENS7-04-4	RUS	SIB ARI	Astana	1
13	TULAIKOVSKAYA ZOLOTISTAYA	RUS	SAMARA	Astana	1
14	TULAIKOVSK 100	RUS	SAMARA	Astana	1
15	P-23-17	RUS	KURGAN	Astana	1
16	PAMYATI RUBA	RUS	CHELYABINSK	Astana	1
17	SY TYRA	US-SYN	US-SYN	Astana	1
18	ADVANCE	US-SDSU	US-SDSU	Astana	1
19	BRICK	US-SDSU	US-SDSU	Astana	1

1	2	3	4	5	6
20	MUCHMORE	CAN		Astana	1
21	URALOSYBIRSKAYA	RUS		Astana	1
22	LYUTESTSENS 27-12	RUS	OMGAU	Astana	1
23	ERITROSPERMUM 85-08	RUS	OMGAU	Astana	1
24	LYUTESTSENS 6-04-4	RUS	SIB ARI	Astana	1
25	LINE D 25	RUS	SARATOV	Astana	1
26	LINE 654	RUS	SARATOV	Astana	1

Table 2 - Distribution of cyst nematodes in some fields of Uralsk region.

№ sample	CNAME	OC	ORIGINATOR	Place of swoing	CCN
9	LUTESCENS106-11	RUS	OMGAU	Uralsk	1
17	SY TYRA	US-SYN	US-SYN	Uralsk	2
18	ADVANCE	US-SDSU	US-SDSU	Uralsk	2
21	URALOSYBIRSKAYA	RUS		Uralsk	1
70	SY ROWYN	US-SYN	US-SYN	Uralsk	1
89	LINE D 25	RUS	SARATOV	Uralsk	1

From West Kazakhstan, Uralsk research station was taken 90 soil sample by 350 gr, collected 9 cysts. By microscopic identifies, plant parasitic nematodes were identified – *Heterodera spp*.

Table 3 – Distribution of cyst nematodes in some fields of Almaty region.

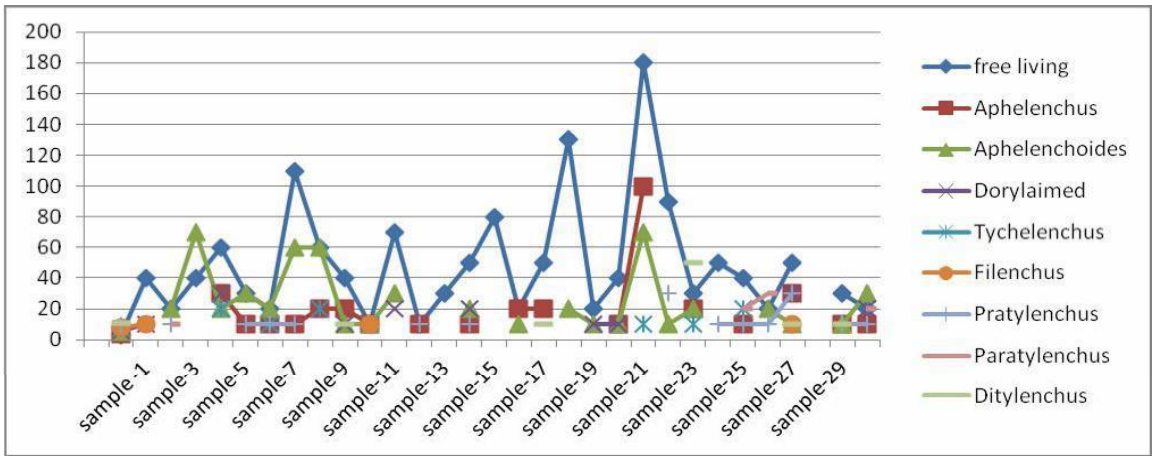
№ sample	CNAME	OC	ORIGINATOR	Place of swoing	CCN
1	2	3	4	5	6
71	SERI			Almaty	2
2	STEPNAYA75	KAZ	AKTOBE ARS	Almaty	1
3	STEPNAYA1414	KAZ	AKTOBE ARS	Almaty	4
4	GVK2055-1	KAZ	EAST-KAZAKHSTAN ARI	Almaty	3
5	LUTESTSENS2	KAZ	KARABALYK ARS	Almaty	3
6			KARABALYK ARS-	Almaty	1
	LINE-C-19SB	KAZ	CIMMYT		
7	KARABALYKSKAYA 20	KAZ	KARABALYK ARS	Almaty	5
8	FANTAZIYA	KAZ	KARABALYK ARS	Almaty	4
9			KARABALYK & KAZ RI	Almaty	4
	BOSTANDYK	KAZ	PLANT PROTACTİON		
10	LUTESCENS 30 69/97	KAZ	KARABALYK ARS	Almaty	6
11	KARAGANDINSKAYA 30	KAZ	KARAGANDA ARI	Almaty	10
12	KARAGANDINSKAYA 31	KAZ	KARAGANDA ARI	Almaty	5
13	PAVLODARSKAYA			Almaty	5
	YUBILEYNAYA	KAZ	PAVLODAR ARI		
14	KONDITERSKAYA			Almaty	3
	YAROVAYA	KAZ	PAVLODAR ARI		
15	FITONC-50SB	KAZ	FITON-CIMMYT	Almaty	5

1	2	3	4	5	6
16	FITON82	KAZ	FITON	Almaty	2
17	FITON-C-54SB	KAZ	FITON-CIMMYT	Almaty	0
18	EKADA148	KAZ	FITON-EKADA	Almaty	4
19	EKADA 113	KAZ	FITON	Almaty	1
20	LYUBAVA	KAZ	FITON	Almaty	5
21	FITON 41	KAZ	FITON	Almaty	1
22	FITON 204	KAZ	FITON	Almaty	2
23	VLADIMIR	KAZ	SHORTANDY ARI	Almaty	3
24	TSELINA50	KAZ	SHORTANDY ARI	Almaty	5
25	TSELINNAYA NIVA	KAZ	SHORTANDY ARI	Almaty	5
26	ASYLSAPA	KAZ	SHORTANDY ARI	Almaty	1
27	AKMOLA 2	KAZ	SHORTANDY ARI	Almaty	4
28	AK ORDA	KAZ	SHORTANDY ARI	Almaty	2
29	SHORTANDINSKAYA 2012	KAZ	SHORTANDY ARI	Almaty	5
30	TSELINNAYA 3S	KAZ	SHORTANDY ARI	Almaty	3
31	ASTANA	KAZ	SHORTANDY ARI	Almaty	4
32	ALTAISKAYA70	RUS	ALTAY ARI	Almaty	3
33	ALTAISKAYA110	RUS	ALTAY ARI	Almaty	2
34	TOBOLSKAYA	RUS	ALTAY ARI	Almaty	5
35	ALTAYSKAYA ZHNITSA	RUS	ALTAY ARI	Almaty	1
36	STEPNAYA VOLNA	RUS	ALTAY ARI	Almaty	1
37	APASOVKA	RUS	ALTAY ARI	Almaty	1
38	LUTENSCENS89-06	RUS	OMGAU	Almaty	1
39	DUET	RUS	OMGAU	Almaty	1
40	PAVLOGRADKA	RUS	OMGAU	Almaty	1
41	LUTESCENS29-12	RUS	OMGAU	Almaty	2
42	LUTESCENS106-11	RUS	OMGAU	Almaty	3
43	TULAIKOVSKAYA110	RUS	SAMARA	Almaty	1
44	LUTESCENS916	RUS	SAMARA	Almaty	4
45	GRECUM1003	RUS	SAMARA	Almaty	1
46	LUTESCENS1062	RUS	SAMARA	Almaty	1
59	GREKUM 650	RUS	SAMARA	Almaty	1
60	LUTESCENS 920	RUS	SAMARA	Almaty	1
61	EKADA 121	RUS	SAMARA	Almaty	2
62	CIMMYT	RUS	SAMARA	Almaty	2
63	P-23-17	RUS	KURGAN	Almaty	2
64	PAMYATI RUBA	RUS	CHELYABINSK	Almaty	1
74	PREVAIL	US-SDSU	US-SDSU	Almaty	4
88	CHEBARKULSKAYA 3	RUS	CHELYABINSK	Almaty	1
89	LINE D 25	RUS	SARATOV	Almaty	2
90	LINE 654	RUS	SARATOV	Almaty	1

While doing survey some main wheat growing areas (South Kazakhstan – Almaty region) collected 150 cyst nematodes from 90 soil samples By microscopic identification of plant parasitic nematodes were identified – *Heterodera spp*. Cereal cysts nematodes are also capable of reproducing on a wide range of economically important grasses that include bentgrass, bluegrass, fescue, ryegrass, brome, orchard grass, canary grass, timothy, and sorghum. These crops should not precede wheat, barley, or oat in crop rotations on fields where cereal cyst nematodes are known to be present.

By doing survey in West and South – East part of Kazakhstan was taken 180 soil samples. From West Kazakhstan, Uralsk research station was taken 90 soil sample by 150 gr, also from South – East Kazakhstan, Kaskelen research station was 90 soil samples.

The results were given on the figure 1.



Inconclusion. As a result, was found 24 cyst nematodes from 90 siol samples at province of Shortandy, found 9 cyst nematodes from 90 soil samples, 150 cyst nematodes from 90 soil samples. Performing microscopic identification of intercepted nematodes, the following species of plant parasitic nematodes were identified – *Heterodera spp.* As mentioned before was taken 180 soil samples from both regions, by doing microscopically identification from 64 soil samples we found free living nematodes and plant parasite nematodes. Performing microscopic identification of intercepted nematodes, the following species of plant parasitic nematodes were identified – *Aphelenchus spp – 260 pieces, Aphelenchoides spp – 290 pieces, Tylenchus spp – 50 pieces , Filenchus spp 30 pieces, Pratylenchus spp - 30 pieces, Parapratylenchus spp – 10 pieces, Ditylenchus spp – 100 pieces at the province of Ural; also at the province of Almaty were identified - Aphelenchus spp – 303 pieces, Aphelenchoides spp – 570 pieces, Tylenchus spp – 110 pieces, Filenchus spp – 30 pieces, Pratylenchus spp – 170 pieces, Parapratylenchus spp – 90 piesec, Ditylenchus spp – 90 pieces.*

REFERENCES

1. Приданников М. В., Шумилина Д. В., Кромина К. А. Изучение взаимоотношений между нематодами и растениями хозяевами/не хозяевами с использованием модельной системы суспензионной культуры растительных клеток: Материалы III Межрегиональной научн. конф. паразитологов Сибири и Дальнего востока. Новосибирск, 2009. с. 226—228.

2. Фитопаразитичекие нематоды России /под ред. С. В. Зиновьевой и В. Н. Чижовой. М.: Товарищество научных изданий КМК, 2012.

3. Campbell, J.F. How and why a parasitic nematode jumps [text]./H.K. Kaya. 1999. Nature 397: 485-486.

4. Cullis BR. Analysis of yield and oil from a series of canola breeding trials. Part II: exploring VxE using factor analysis [text]./ Smith AB, Beeck C, Cowling WA BR Genome 2010,, 53, 1002-1016.

5. Hooper, D.J. 1972. Ditylenchus dipssaci. Commonwealth Institute of Helminthology Descriptions of Plant Parasitic Nematodes [3], Set 1, No. 14, St. Albans, England.

ТҮЙІН

Зерттеу жүргізу барысында Солтүстік Қазақстандағы А.И. Бараев атындағы зерттеу институтының (Шортанды) дәнді дақылдар өсіретін егістіктерінен 90 дана топырақ сынамалары алынды, олардың нәтижелері бойынша алғаш рет цисто түзуші 24 нематод анықталды, Батыс Қазақстандағы Орал тәжірибе станциясында 90 дана топырақ үлгісі алынды, 9 циста түзуші нематода, Оңтүстік-Шығыс Қазақстанда, Қаскелең ғылыми-зерттеу станциясында 90 дана топырақ үлгілері алынып, 150 цисто түзуші нематодалар анықталды. Аталып өткен аймақтардағы сынамаларды микроскопиялық идентификациялау нәтижесінде *Heterodera spp* нематод түрі анықталды. Қазақстанның батыс және оңтүстік-шығысындағы бидай өсірілетін аймақтардан 180 топырақ сынамалары алынып, микроскопиялық идентификация әдісімен 64 сынамадан нематодтар мен паразиттік өсімдік нематодтары анықталды: *Aphelenchus spp* - 260 дана, *Aphelenchoides spp* - 290 дана, *Tylenchus spp* - 50 дана, *Filenchus spp* - 30 дана, *Pratylenchus spp* - 30 дана, *Parapratylenchus spp. Ditylenchus spp* - 100 дана Орал тәжірибе станциясында; сонымен қатар Алматы облысында - *Aphelenchus spp* - 303 дана, *Aphelenchoides spp* - 570 дана, *Tylenchus spp* - 110 дана, *Filenchus spp* - 30 дана, *Pratylenchus spp* - 170 дана, *Parapratylenchus spp* - 90 дана, *Ditylenchus spp* - 90 дана.

РЕЗЮМЕ

При проведении обследований в некоторых выращиваемых зерновых культур Северного Казахстана - Шортанды, в НИИ им. А.И. Бараева было отобрано 90 проб почвы, по результатам которых впервые обнаружено 24 цисто образующие нематоды, в Западном Казахстане в Уральской опытный станции отобрано 90 проб почвы, найдено 9 цисто образующих нематод, в Юго - Восточном Казахстане, на научно-исследовательских станциях Каскелена было взято 90 проб почвы, было обнаружено 150 цисто образующих нематод. В результате микроскопической идентификации было идентифицировано вид нематода *Heterodera spp*. В районах выращивания пшеницы на западе и юго-востоке Казахстана было взято 180 образцов почвы. Путем микроскопической идентификации 64 образцах были обнаружены свободноживущих нематод и паразитические нематоды растений: *Aphelenchus spp* - 260 штук, *Aphelenchoides spp* - 290 штук, Tylenchus spp - 50 штук, Filenchus spp 30 штук, Pratylenchus spp - 30 штук, *Parapratylenchus spp* - 10 шт., *Ditylenchus spp* - 100 шт. в Уральской опытный станций; также в Алматинской области выявлены - *Aphelenchus spp* - 303 шт., *Aphelenchoides spp* - 570 шт., *Tylenchus spp* - 110 шт., *Filenchus spp* - 30 шт., *Pratylenchus spp* - 170 шт., *Parapratylenchus spp* - 90 шт., *Ditylenchus spp* - 90 шт.

UDC 631.147:633

Ansabayeva A.S., doctor PhD, associate professor
Kurmangalieva N.B., master's student
A. Baitursynova Kostanay State University, Kostanay, Republic of Kazakhstan, 110000, Kostanay state, 47 A. Baitursynova street, Republic of Kazakhstan

BIOLOGICAL METHODS OF CHICKPEA CULTIVATION IN THE CONDITIONS OF NADEZHDINKA LLP IN KOSTANAY REGION

Abstract

The aim of the study was to study the influence of the use of biological preparations on the formation of chickpea grain yields in the conditions of the Kostanay region. Experimental studies were carried out at a pilot site in Nadezhdinka LLP, with repetition in time 2018-2019, in three times repetition. In studies, the Yubileiny chickpea variety allowed for sowing, which is resistant to diseases, is distinguished by the shortest vegetation period among other chickpea varieties, beans are resistant to cracking. Seed sowing capacity was 95%, laboratory germination was 92%, field germination of chickpeas on the version using the biological preparation Baikal M- was 70.2%, using Baikal -M + risotorphine was 78.4% preservation of chickpea plants on the version using the biological preparation Baikal-M -85.4%, using Baikal -M + risotorphine -75.2%.