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DIAPORTHE (Phomopsis) spp. ON WEEDS AS POSSIBLE CAUSATIVE AGENTS OF SUNFLOWER STEM CANCER IN THE VOJVODINA PROVINCE

M.Mihaljčević[1], Jelena Vukojević[2]

1 Faculty of Agriculture, Institute of Field and Vegetable Crops, 21000 Novi Sad, Maksima Gorkog 30, Yugoslavia
2 Faculty of Science, Institute of Botany, 11000 Belgrade, Takovska 43, Yugoslavia

SUMMARY

This paper considers an hypothesis that *Diaporthe (Phomopsis)* spp. on herbaceous weed species were the initial inoculum which, in the early 1980's triggered the epiphytotics of the sunflower disease caused by the fungus *Diaporthe (Phomopsis) helianthi* Munt.-Cvet. et al., in the Vojvodina Province. A ten-year study on more than 50 herbaceous weed species, conducted in 40 locations, found 18 *Diaporthe* and *Phomopsis* isolates.Correlation between individual weed species populations and the frequency and intensity of occurence of disease symptoms, ascomata and conidiomata was low. A separate analysis studied the reaction of sunflowers to two of the three *Phomopsis* species isolated from *Xanthium italicum* Moretti. The conclusion that the extensive presence of *Phomopsis helianthi* on diseased sunflower plants in the Vojvodina Province is solely responsible for epiphytotic outbreaks of *Phomopsis*, is still valid.

Key words: Diaporthe, Phomopsis, sunflower

INTRODUCTION

Available data suggest that fungi of the genera *Diaporthe* and *Phomopsis* have been isolated from infected sunflower stems in Yugoslavia (Mihaljčević et al.,1980; Marić & Maširević, 1980; Aćimović & Štraser, 1982), Australia (Allen et al.,1980), Hungary (Nemeth et al.,1981), Romania (Vranceanu et al.,1981), Brazil (Homechin & Franca Neto, 1982), USA (Ohio - Herr & Lipps,1983; Texas- Yang et al.,1984; Minnesota and North Dakota -Hajdu et al.,1984), France (Regnault, 1985; Lamarque & Perny, 1985), Moldavia (Bogdanova et al., 1986) and Pakistan (Maširević et al.,1987; Rauf Bhutta et al.,1992). Through personal contacts, it has been gathered, that the disease has also been observed in Bulgaria, the Ukraine and southern Russia.

The alledged wide geographical distribution of the disease is due to a misconcept that all *Phomopsis* strains isolated from sunflower are causative agents of the disease caused by *Diaporthe (Phomopsis) helianthi* Munt.-Cvet. et al., (Munt.-Cvet. et al.,1981). Mycological investigations over a long period have shown that the territory infested by the fungus described as *Diaporthe (Phomopsis) helianthi* Munt.-Cvet. et al., may be divided into two clearly distinguishable areas: 1) northern Yugoslavia, Romania, Bulgaria along the Danube River, southeastern Hungary, Moldavia, and territories further east, towards the Ukraine and southern Russia, and 2) France. The *Phomopsis* species from Texas, which differ from those in Yugoslavia in their capacity to easily form perithecia in pure culture, may be considered as a special biotype of *Diaporthe helianthi* (Munt.-Cvet. et al., 1985). Characteristics of the *Phomopsis* species isolated in Brazil, USA (Ohio, Minnesota and North Dakota), Australia, and Pakistan suggest that the species observed there may belong to the genus *Diaporthe (Phomopsis)* but these are definitely not *Diaporthe (Phomopsis) helianthi.*

Comparing the occurence of *Phomopsis* in the different countries over the years one may get the impression that the whole thing started on a relatively small territory between the Carpathian Mountains in the east and the rivers Tisza and Danube in the west. Not only was it the site of the first outbreak of the disease, but also epiphytotics were registered there in the first year of the outbreak of the disease. The subsequent spread of the disease further east has never been as fast and as intensive as the first year. Basic data on the occurence and spreading of the disease in France were provided by Jouvet and Teyssier (1992).

Starting with the premise that some herbaceous weed species might have been an alternate host or even the primary source of inoculum, we conducted a ten-year study of *Diaporthe (Phomopsis)* populations on herbaceous weed species in the Vojvodina Province. Our objective was to find evidence to substantiate the above hypothesis.

MATERIAL AND METHOD

The weed species studied were systematically collected throughout the year in the period from 1982 to 1992 in 40 locations in the Vojvodina Province.

The following parameters were monitored: population size of the weeds, presence or absence of identifiable disease symptoms prior to the occurence of pycnidia and/or perithecia, intensity of symptoms, frequency of occurence of reproductive structures on infected tissues, and sample status (live leaf and stem tissues or detritus).

An areas of about 10 km.sq. was inspected in each location. The relatively large areas under surveilance made us focus our attention on large weed populations. Medium-size populations (groups comprising a score or so plants) were of secondary importance, and individual plants were taken into consideration only when the species in question were extremely rare.

Samples of infected leaves and cankered stems were collected in the course of the growing season, dead stems or stem fragments during winter. In the former case, samples of infected sunflower leaves and stems were also collected from neighbouring sunflower and soybean fields.

The weed species populations at Rimski Šančevi, in the immediate vicinity of the Experiment Field of the Institute of Field and Vegetable Crops, served as checks.

Conventional isolation techniques were applied. The behaviour of cultures was studied under various light, temperature, and nutrient conditions, as described by Muntañola-Cvetković et al., (1985).

RESULTS AND DISCUSSION

The parasitic fungus *Diaporthe helianthi* Munt.-Cvet. et al., (anamorph *Phomopsis helianthi* Munt.-Cvet. et al.,) had been described on the basis of morpho-physiological characteristics and inoculation tests which used techniques with wounded and intact plant tissues (Muntañola-Cvetković et al., 1981).

The outbreak of a new sunflower disease, caused by an unknown disease agent, had given rise to many speculations about the origin of the parasite. Among cultivated plants, the soybean (*Glycine max* Mer.), a host to several *Phomopsis* species, has been mentioned repeatedly as a possible source of the inoculum. However, detailed mycological analyses and a number of inoculation tests have refuted that hypothesis (Muntañola-Cvetković et al., 1981; Muntañola - Cvetković et al., 1985; Mihaljčević & Muntañola-Cvetković, 1985a; Vukojević et al., 1988).

After establishment of the Active European Collection of *Helianthus* species at the Experiment Field of the Institute of Field and Vegetable Crops, it has implied that the introduction of a large number of *Helianthus* species from USA, should also be dismissed as a possible primary source of the inoculum because first samples were imported to Yugoslavia in the fall of 1980, i.e., several months after the outbreak of the disease. Explaining the distribution of *Phomopsis* on the global scale, Iliescu et al., (1992) indicated that a contaminated breading material might have been a source of the primary inoculum. In the case of Yugoslavia, this hypothesis is not valid. The epiphytotics of the disease, which involved tens of thousands of hectares in the first year of the outbreak of the disease, would have requested enormous quantities of the inoculum (conidia or ascopores). Limited amounts of breeding material that are usually exchanged could not provided required amounts of the inoculum, even if the materials had been heavily infected. All tests with heavily artificial infected seed samples conducted so far have shown that the fungus tended to produce mycelia and pycnidia with b-conidia which were all sterile. If the infected seeds had intact embryos, they would produce healthy plants in the subsequent generation.

It ensues that the causative agent of the disease had existed on the territory of the Vojvodina Province on an alternate host.

Diedicke (1911), Migula (1921), Wehmeyer (1933), Grove (1935), Munk (1957), and Vörös (1969) mention weed species as hosts of the fungi of the genera *Diaporthe* and *Phomopsis*. Since mycological investigations have indicated that the *Phomopsis* isolated from sunflowers may be classified into group *Diaporthe arctii* (Muntañola-Cvetković et al., 1981), attention had be given to *Arctium lappa* L., *Achillea millefolium* L., and *Arctium tomentosum* L. (the last species being extremely rare in the Vojvodina Province) as hosts of the fungi *Diaporthe arctii* (Lasch) Nitschke and *Diaporthe arctii var.achilleae* Wehm. First pure *Phomopsis* cultures from weed species collected in the Vojvodina Province were obtained from infected tissues of *Arctium lappa* L., and *Achillea millefolium* L. Up until 1985 the occurrence of fungi from the genera *Diaporthe* and *Phomopsis* had been systematically checked on 46 herbaceous species in 50 locations (Mihaljčević & Muntañola-Cvetković, 1985b). The number of locations was subsequently reduced to 40, because of the long-continued drought, but the number of weed species under surveilance was increased to more than 50, including primarily those species which inhabit humid sites along rivers and channels. The ten-year investigation produced 18 pure isolates of *Diaporthe/Phomopsis* (Tables 1 and 2).

The diversity of soil type in the Vojvodina Province (chernozem, hydromorphyc, sandy and saline soils) has a considerable effect on the diversity of the weed species present. Both the composition and frequency of individual species varied from location to location as well as from year to year, although the number of species occuring in only one or in a few locations was low (e.g. *Arctium tomentosum* L.). With the exception of *Arctium tomentosum* L., *Centaurea scabiosa* L. and *Tanacetum vulgare* L., the weed species playing host to *Phomopsis* were present in all location studied.

Occurence of symptoms on weed leaves and/or stems similar to those occuring on the sunflower may not be a reliable indication of the presence of *Phomopsis*. Although similar symptoms do occur on the leaves of *Amaranthus retroflexus* L. and *Artemisia vulgaris* L., the parasite has never been isolated from necrotic spots on the leaves. The above is true also for *Cardaria draba* L., although the number of samples studied was considerably lower.

Even though the form and structure of leaves of *Achillea millefolium* L., *Tanacetum vulgare* L., and *Tripleurospermum maritimum* Schult., preclude the occurence of symptoms similar to those occuring on the sunflower, *Phomopsis* was isolated from the necrotic spots on the stems of all three species. However, similar symptoms on the stems of *Datura stramonium* L. and *Anthemis arvensis* L. were evidently caused by fungi from the genus *Alternaria*. *Phomopsis* were not found on *Senecio vulgaris* L., *Convolvulus arvensis* L., and *Abutilon theophrasti* Medic. in a single location although these species are well-known hosts of parasite from the genus *Phomopsis* and although they are common members of the weed flora of the Vojvodina Province. An occurence of pycnidia on overwintered stems of *Lactuca serriola* L. in massive quantities is a reliable indication of the presence of fungi from the genus *Phomopsis*. Although the overwintered stems of *Chenopodium album* L., *Cephalaria transilvanica* L., and *Melilothus albus* Medic. had almost identical symptoms and an abundance of reproductive structures, *Phomopsis* was never isolated from these species. It should be mentioned that *Phomopsis* was isolated from *Centaurea scabiosa* L. but never from *Centaurea cyanus* L. although, in some locations, the two species shared the same site.

It can be assumed that large quantities of the inoculum could have been supplied by the weed species occuring in large populations, which are regularly infected by *Phomopsis*, and which host large numbers of pycnidia with fertile conidia or perithecia with ascospores. The study of a possible connection between high populations of individual weed species and the frequency and intensity of symptoms, conidiomata, and ascomata showed no correlation between the parameters studied. High populations of *Lactuca serriola* L., with regular and intensive symptoms of *Phomopsis*, could be a source of the inoculum, but the morpho-physiological characteristics of the *Phomopsis* isolated from that species differed substantially from the charcteristics of *Phomopsis* isolated from the sunflower. Conversely, the large populations of *Achillea millefolium* L. and *Amaranthus retroflexus* L., generally remain healthy, having few low-intensity symptoms. A separate problem in this study was that weeds' population, because of the large area under surveillance and a non-uniform weed distribution, cannot be expressed in the usual way, i.e., the percentage of cover (number of plants of a certain species per meter square). The same problem exists for the intensity of occurence of reproductive structures on individual plants or groups of plants.

Arctium lappa L. and *Tanacetum vulgare* L. occur most frequently as solitary plants or in small groups. Conversely, *Achillea millefolium* L. and *Tripleurospermum maritumum*

Schult. occur almost regularly in large populations. However, the same percentages of infected plants of the first and the second group do not produce the inoculum of the same potential: a high percentage of infected *Arctium lappa* L. or *Tanacetum vulgare* L. plants may create a much smaller infection potential than a relatively small percentage of infected *Achillea millefolium* L. or *Tripleurospermum maritimum* Schult. plants.

Phomopsis diseases manifested by their characteristic symptoms on leaves and stems, usually cause death of the host plant (Kulik, 1984). Among the weeds observed, the above is true only for the pathogenesis of one of the three *Phomopsis* species isolated from *Xanthium italicum* Moretti. Infection of the other weed species under surveillance resulted in no observable symptoms until the host was senescent (*Arctium lappa* L. and *Lactuca serriola* L.) or dead (Table 1).

Although it was not the principal intention of the present report to analyze the nature of symptomless infection or colonization of host plants, it is obvious that isolating *Phomopsis* only from detritus may bring in question the parasitic nature of the fungus. It should be mentioned here that even before 1984, *Phomopsis helianthi* as well as the other four *Phomopsis* isolates with conidiomata filled with α or α and β conidia had been isolated from overwintering debris. A natural ingress of hyphae of the four isolates could not be demonstrated; however, when introduced into wounded host tissues, these isolates were even more destructive than *Phomopsis helianthi*. The same is true for the *Phomopsis* isolated from the 15 weed species. Natural host-parasite relationships could not be established between *Helianthus annuus* and the *Phomopsis* found on the sunflower and the weeds, with the exception of *Phomopsis helianthi*, because it was necessary to use wounding techniques, which are a rather unnatural way to demonstrate the pathogenicity of a fungus, to induce pathological processes in the sunflower (Mihaljčević et al., 1982; Mihaljčević & Muntañola-Cvetković, 1985a; Mihaljčević & Muntañola-Cvetković, 1985b).

Subsequent mycological studies have completely counterminded the hypothesis that any of the weed species studied might have been the alternate host of the *Phomopsis* on the sunflower, i.e., that the *Phomopsis* isolated from the weed species could have affected the sunflower. Qualitative and quantitative similarities and differences, expressed through 242 morpho-physiological attributes of 60 different cultures belonging to the genera *Diaporthe* and *Phomopsis* isolated from 23 plant species, confirmed that the Phomopsis isolated from the sunflower is a distinct species (Vukojević et al., 1988).

During observations of the Danubian flora, Carriere and Petrov (1990) found that *Xanthium italicum* Moretti. and *Helianthus annuus* shared identical symptoms caused by *Phomopsis helianthi*. Because of the similarity of the symptoms, taxonomic position of the genera *Helianthus* and *Xanthium*, American origin of the two genera, and the fact that both causative agents belonged to the genus *Phomopsis*, the authors conducted a detailed study in order to establish taxonomic relationships between the *Phomopsis* isolated from *Xanthium italicum* Moretti. and that isolated from *Helianthus annuus*. Important characteristics of the newly isolated fungus were the production of β-conidia and absence of α-conidia. The teleomorphic form was systematically observed on the medium. The Phomopsis from *Xanthium italicum* Moretti. had already been isolated in the same region (Mihaljčević & Muntañola-Cvetković, 1985b). The prolific production

Table 1. *Phomopsis* sp. on herbaceous species - Rimski Šančevi (1982-1992)

Species	Size of population	Disease symptoms	Intensity of symptoms	Pathogenesis
Achillea millefolium L.	large	very rare	weak	symptomless
Amaranthus retroflexus L.	large	extr.rare	extr.weak	symptomless
Arctium lappa L.	medium	common	medium	on stem only
Artemisia vulgaris L.	medium	very rare	extr.weak	symptomless
Centaurea scabiosa L.	small	rare	weak	symptomless
Cichorium intybus L	large	common	medium	symptomless
Cirsium arvense Scop.	large	common	weak	symptomless
Daucus carota L.	large	common	weak	symptomless
Lactuca serriola L.	large	common	abundant	on stem only
Solidago gigantea L.	small	rare	weak	symptomless
Sonchus arvensis L.	medium	rare	weak	symptomless
Sonchus oleraceus L.	small	very rare	weak	symptomless
Tanacetum vulgare L.	small	extr.rare	extr.weak	symptomless
Tripleurospermum maritimum Schulth.	medium	rare	weak	symptomless
Xanthium strumarium L.	medium	common	abundant	as on *H.annuus*
Xanthium italicum Mor. (1)	large (medium)	common	abundant	as on *H.annuus*
Xanthium italicum Mor. (2)	large (medium)	common	abundant	as on *H.annuus*
Xanthium italicum Mor. (3)	large (medium)	common	extr.weak	symptomless
Helianthus annuus L.	large	common *	abundant	leaf - petiole - stem

*On susceptible genotype
(1) Isolated by Mihaljčević and Muntañola-Cvetković (1984)
(2) Isolated by Carriere and Petrov (1990)
(3) Isolated by Vukojević and Mihaljčević (1990)

of α-conidia and absence of β-conidia as well as the teleomorphic form on the medium are the characteristics which distinguish that parasite from the newly isolated one.

After the discovery of the *Phomopsis* on *Xanthium italicum* Moretti. which had only β-conidia in the pycnidia, we conducted a detailed investigation of that weed species all around the Vojvodina Province. Some of the populations studied were dominated by α-conidia, others by β-conidia. Conidiomata of both types were frequently found on plants growing in small groups. Both pycnidium types were also found in the check location (Rimski Šančevi). A third pycnidium type, with both α- and β-conidia, was found in the immediate vicinity of the experiment field, on dried *Xanthium italicum* Moretti. stems.

Carriere and Petrov (1990) performed a series of inoculations using a suspension of ascospores and mycelial mats as the inoculum. They concluded that the symptoms provoked by *Phomopsis* on *Xanthium italicum* Moretti. are, in all points, identical to those caused by *Phomopsis (Diaporthe) helianthi* Munt.-Cvet et al. Since the *Phomopsis* from *Xanthium italicum* Morreti. produces perithecia profusely when cultivated on PDA, as does the *Phomopsis* isolated from the sunflower in Texas, while the *Phomopsis* isolated from the sunflower in the Vojvodina Province does not, Carriere and Petrov (1990) concluded that this characteristic circumstance brings the parasite near the biotype of *Phomopsis* isolated by Yang (1984), i.e., that *Phomopsis helianthi* could be an adapted form of *Phomopsis "xanthium"* on a new host, *Helianthus annuus*.

The search for a biotype capable of producing the teleomorphic stage on a substrate continued ever since the discovery made by Yang et al., (1984). Two cultures from Texas were included in investigation for comparative purposes (Muntañola-Cvetković et al., 1985). All attempts to isolate *Phomopsis* identical to that from Texas on the sunflower in the Vojvodina Province have failed.

Although the subsequent mycological investigations showed that *Phomopsis "xanthium"* and *Phomopsis helianthi* differ not only in the capacity to form perithecia on a substrate but also in other characteristics (Muntañola-Cvetković et al., 1992: Vukojević & Muntañola-Cvetković, 1992), we shall nevertheless consider the relationships of the two parasites and their hosts in field conditions.

In the Vojvodina Province, large *Xanthium italicum* Moretti. populations are frequently found near sunflower fields. When herbicides are not applied for whatever reason, the two plant species tend to develop a mixed community. All analyses made so far suggest that, in heavily infected fields, the two plant species are infected by two different *Phomopsis* species. In the course of the growing season, *Phomopsis* helianthi was invariably isolated from the sunflower and conidiomata with α- and β-conidia from *Xanthium italicum* Moretti. That the two *Phomopsis* species are different is frequently exemplified in sunflower fields when sunflower plants are heavily infected while all *Xanthium italicum* Moretti. plants remain healthy, and vice versa. The two plant species emerge at approximately the same time, they also mature at the same time, they grow in similar agro-ecological and soil conditions; so, in accordance with the hypothesis on the same identity of the two agents, they should share the same inoculum. Success in cross-infection (*Phomopsis "xanthium"* on the sunflower and *Phomopsis helianthi* on cocklebur) in controlled conditions in the greenhouse should be confirmed by isolations of *Phomopsis helianthi* from *Xanthium italicum* Moretti. and of *Phomopsis "xanthium"* from the sunflower in field conditions. Systematic isolations of *Phomopsis* from infected sunflower and cocklebur plants, conducted in the last two years, could not prove the hypothesis.

The conclusion, therefore, of Muntañola-Cvetković et al., (1985), that the extensive presence of *Phomopsis helianthi* on diseased sunflower plants in the Vojvodina Province is solely responsible for the epiphytotic outbreaks of *Phomopsis*, is still valid.

For the present, the hypothesis on the alternate host can neither be proved nor entirely dismissed. Symptomless infection and colonization of host plant tissues later in the fall as well as a rapid decay of plant tissues of many weed species may practically obstruct the monitoring of the development of pycnidia and perithecia. Although the genus *Phomopsis* is known for its cyclic occurrence we still need explanations for the outbreak of *Phomopsis helianthi* in geographically distant France in the mid-eighties and for the enormous quantities of the inoculum which caused epiphytotics in French sunflower fields in 1992, after three years of weak attacks (Jouve & Teyssier, 1992).

Table 2. Source of inoculum, conidiomata and ascomata on herbaceous species - Rimski Šančevi (1982-1992)

		Pycnidia		Perithecia		Intensity of conidia			
Species	Source of inoculum	Plant	Medium	Plant	Medium	α (plant)	α (medium)	β (plant)	β (medium)
Achillea millefolium L.	detritus	*	*			***	***	*	
Amaranthus retroflexus L.	detritus	*	*			***	***	*	
Arctium lappa L.	senescent plant	*	*	*	*	*	*	***	***
Artemisia vulgaris L.	detritus	*	*	*	*	***	***	*	* (4)
Centaurea scabiosa L.	detritus	*	*				***		
Cichorium intybus L.	detritus	*	*			***	**	*	*** (5)
Cirsium arvense Scop.	detritus	*	*			*	***		
Daucus carota L.	detritus	*	*			*	**	***	**
Lactuca serriola L.	senescent plant	*	*			***	***	*	**
Solidago gigantea L.	detritus	*	*	*		*	*		
Sonchus arvensis L.	detritus	*	*			**	**	*	*
Sonchus oleraceus L.	detritus	*	*			**	**	*	*
Tanacetum vulgare L.	detritus	*	*	*			**		*** (6)
Tripleurospermum maritimum Schulth.	detritus	*	*				*		*
Xanthium strumarium L.	leaf-petiole-stem	*	*			**	**	*	*
Xanthium italicum Mor. (1)	leaf-petiole-stem	*	*				**		
Xanthium italicum Mor. (2)	leaf-petiole-stem	*	*	*	*			***	***
Xanthium italicum Mor. (3)	detritus	*	*				***	***	*
Helianthus annuus L.	leaf-petiole-stem	*	*	*				***	***

(1) Isolated by Mihaljčević and Muntañola-Cvetković (1984)

(2) Isolated by Carriere and Petrov (1990)

(3) Isolated by Vukojević and Mihaljčević (1990)

(4) Only on some media

(5) Very variable ratio of α/β conidia

(6) Diaporthe isolate produce only α conidia

The search for the alternate host retains theoretical and practical importance. If it exists, the life cycle of the parasite goes on unimpeded, regardless of the fact that the introduction of resistant hybrids has practically "erased" *Phomopsis* from sunflower fields. Selection pressure on the parasitic population may abate, although new races of the parasite may be expected to appear in the future. The dynamics of the occurrence of new races will certainly depend on the parasite's capacity for change. There is no proof that *Phomopsis* races exist, but, neither are there differential lines which could be used to prove their existence.

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DIAPORTHE (PHOMOSIS) SPP. SOBRE MALAS HIERBAS COMO POSIBLE AGENTE CAUSANTE DEL CAUCRO DE TALLO DE GIRASOL EN LA PROVINCIA DE VOJVODINA

RESUMEN

Esta publicación considera en hipótesis de que las especies herbáceas de malas hierbas han sido el inóculo inicial, que en los comienzos de los ochenta desencadenaron la epidemia de la enfermedad de girasol causada por *Diaporthe (Phomosis) helianthi* Munt. Cvet. et al, en la provincia de Vojvodina. Un estudio de diez años sobre mas de 50 especies herbàceas de malas hierbas, llevado a cabo en 40 localidades, dio lugar a 18 aislamientos de *Diaporthe* y *Phomosis*. Se encontraron bajas correlaciones entre el tamaño de población de especies individuales de malas hierbas, por un lado y la frecuencia e intensidad de la ocurrencia de síntomas de la enfermedad, ascosporas y considiosporas, por otro. Un análisis separado trata de la reacción del girasol con dos de las tres especies de *Phomosis* aisladas de *Xanthium italicum* Moreti. La conclusión de que la extensiva presencia de *P. helianthi* sobre los residuos de girasol es solamente responsable para el brote de la epifitia de la enfermedad en los campos de girasol en Yugoslavia no ha sido satisfecha.

DIAPORTHE (PHOMOPSIS) spp. SUR ADVENTICES COMME POSSIBLE AGENT CAUSAL DE LA NÉCROSE SUR TIGE DU TOURNESOL DANS LA PROVINCE DE VOJVODINE

RÉSUMÉ

Cet article considére l'hypothèse de travail suivante: différentes espéces d'adventices herbacées auralent elles pu être à l'origine de l'inoculum initial responsable dans les années 1980 de l'épiphytotie sur tournesol provoquée par le champignon *Diaporthe (Phomopsis) helianthi* Munt.-Cvet. et al. dans la province de Vojvodine. Une étude de 10 ans sur plus de 50 espéces d'adventices herbacées, conduite sur plus de 40 sites, a permis d'isoler 18 *Diaphorte* et *Phomopsis*. De faibles corrélations ont été trouvées entre la taille des populations issues des espéces herbacées d' un coté et la fréquence et l'intensité de l'apparition des symptômes de la maladie, les formes ascomiciennes et conidiennes de l'autre. Les trois espéces de *Phomosis* isolées sur *Xanthium italicum* Moretti ont fait l'object d'une analyse séparée. Nous n'avons pas discuté le point suivant: la présence extensive de *Phomopsis helianthi* sur résidus de tournesol est elle seule responsable de l'épiphytotie de cette maladie en Yougoslavie.