

柳蜷叶丝角叶蜂生物学特性及其防治

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摘 要:柳蜷叶丝角叶蜂 *Phyllocolpa* sp. 是近年在甘肃天水发现的一种新害虫, 严重危害多种柳属植物。1 年发生 1 代, 以老熟幼虫在表土 1~5 cm 中结茧越冬。幼虫食柳芽及芽尖内层组织, 造成其外层被干枯芽尖卷束, 叶片弯曲变形形成虫苞, 每年 4 月上旬至 5 月上旬为猖獗危害期。用 1.8% 阿维菌素乳油和 25% 灭幼脲Ⅲ号胶悬剂 2 000 倍液喷冠防治 3 龄前小幼虫, 防效分别为 92.8%、95.2%; 用 3% 高渗苯氧威乳油 4 000 倍液喷冠防治 3 龄后大幼虫, 防效为 96.7%。

关键词:柳蜷叶丝角叶蜂; 生物学; 防治

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The Biological Characteristics and Control of The Willow Sawfly *Phyllocolpa* sp.

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Abstract: *Phyllocolpa* sp. is a serious pest of willow in Tianshui, Gansu Province. It has one generation per year and overwintered as prepupa in cocoon in the topsoil. The larvae occur from early April to early May. The trees were seriously damaged in this period. The control effects were 95.2% and 92.8% with 1.8% Abameotin and 25% Chlorbenzuron at 2 000 times before the third instar larvae. The control effect were 96.7% with 3% Fenoxycarb at 3 000 times after the third instar larvae.

Key words: *Phyllocolpa* sp.; biological characteristics; control.

柳蜷叶丝角叶蜂 *Phyllocolpa* sp. 是发生在甘肃天水市绿化树种柳树上的一种新虫害(种类描述待发表)。1999 年该叶蜂在甘肃天水市秦州、麦积两区发生以来连年猖獗危害。从 2001 年以来对该虫的生物学特性及防治进行了研究。

1 种类、分布及寄主和危害

柳蜷叶丝角叶蜂^[1-6] *Phyllocolpa* sp. 属膜翅目 Hymenoptera、叶蜂总科 Tenthredinoidea、叶蜂科 Tenthredinidae、丝角叶蜂亚科^[1] Nematinae、叶胸丝角叶蜂属 *Phyllocolpa*。本种叶蜂除了甘肃天水市秦州区、麦积区、清水县、秦安县、甘谷县等县区发生, 尚未发现其它新分布区。

寄主为旱柳 *Salix matsudana*、垂柳 *S. babylonica*、红柳 *S. sinopurpurea* 等多种柳属植物。该虫将卵产于未展开的柳树芽尖叶片间, 产卵后的柳芽常留有 1~2 个略呈下陷的小黑点, 为该叶蜂产卵时所

造成的小伤口。幼虫孵化后先从孵化部位向芽尖基部叶组织取食, 仅留芽尖, 随树体的生长发育, 其周围叶片被枯死芽尖卷束成弓形状, 叶片扭曲、皱缩形成虫苞。当虫口数量大时, 整个树冠虫苞累累, 严重影响柳树的观赏价值和生长、危害极大。

2 形态特征

雌成虫 黑色, 体长 4.5~5.5 mm、宽 1.5 mm。头部触角窝下区除前幕骨陷区、上颚端部黑色外黄色, 颊、触角下侧面黄色; 前胸背板后侧角黄白色, 肩片黄色; 足除基节黑色、腿基节部 2/3 黑色或褐黑色、后足跗节深褐色外均黄色, 爪垫褐黑色。尾须黄褐色, 锯鞘黑色, 锯黄褐色。翅透明, 翅痣黄白色。

头、胸部被金黄色小毛。头部刻点小而稀, 单眼区具横向皱纹; 胸部刻点大而密, 但小盾片侧区刻点小而稀少, 后胸小盾片光滑; 腹部背板雕纹细鳞状。锯背片 16 环, 锯腹片 17 齿、齿侧具角质的近腹缘

距,锯刃后缘具成排的梳状细带。

雄成虫 黑色,体长4.0~4.5 mm、宽1.2 mm。后足跗节仅端部深褐色,其余特征同雌虫。

卵 长梭形,两端钝圆,略弯曲,乳白色或灰白色,长0.8~1 mm,宽约0.2 mm,宽是长的1/4。

幼虫 初孵幼虫头黑褐色,体乳白色,体长0.6~0.7 mm、头宽0.3~0.4 mm;老熟幼虫头青绿色,藏红色,体长13~16 mm、头宽1.0 mm(表1)。

表1 各龄幼虫特征
Table 1 Characteristics of every larva instars

虫龄	龄期 /d	平均头宽 /mm	平均体长 /mm	体色(头色)
1龄	3~5	0.2	1.5~2.5	乳白色(头黑色)
2龄	4~5	0.4	2.0~3.5	体绿色
3龄	3~7	0.6	3.5	体绿色
4龄	3~6	0.8	4.5~6.5	体绿色
5龄	5~7	1.0	8.0~17.0	体变短,微红

茧 长椭圆形,褐色,丝质,中间略缢。长6.5~7.5 mm,平均7 mm,宽2.5~4 mm,平均2.9 mm。

蛹 初化蛹为青灰白色,腹侧及前胸背板以头部呈灰白色,略带红色,触角及足透明;复眼浅灰色,后渐变成红褐色,长6.5 mm、宽2 mm;腹部末端约1.3 mm处,突然收缢变细,宽度为最宽处的1/3。

3 生物学特性

3.1 生活史

研究表明,该叶蜂1年发生1代,以老熟幼虫在土壤1~5 cm表土内结茧越冬。翌年3月上旬开始化蛹,蛹期约13~19 d,平均16.2 d,3月中旬化蛹盛期,3月下旬蛹期结束。3月中旬成虫开始羽化,3月下旬成虫羽化盛期,4月上旬成虫期结束。成虫3月中旬开始产卵,4月中旬卵期结束。幼虫3月下旬开始孵化,柳芽处可见虫苞产生,4月中旬幼虫开始老熟,5月上旬幼虫期结束(表2)。幼虫老熟后,下树寻找适宜场所入土结茧越冬。

表2 柳蜂巢叶胸丝角叶蜂生活史(2001年天水)

Table 2 The life history of *Phyllocolpa* sp.

虫态	二月	三月	四月	五月	6至来年1月
预蛹	●●●	●●			
蛹		△△△			
成虫		++	+		
卵		··	··		
幼虫			∞∞∞	∞	
预蛹			●●	●●●	●●●

注:●—预蛹,△—蛹,+—成虫,·—卵,∞—幼虫

3.2 生活习性

蛹期 初化蛹为冰绿色,2~3 d后体色渐变为淡绿色,复眼棕色或棕黑色,1周左右后复眼变黑;10 d至羽化前体为绿色,头及前胸背板为黑,触角

及足白色,即各部位体色斑纹呈成虫状。蛹期13~19 d,平均16.2 d。

成虫期 成虫在茧内羽化,初羽化成虫的翅较软,略带黄色;2 d后全身变黑,触角及足跗节变为灰黑色,基节、胫节变为黑色。初羽化的成虫并不立即爬出土面,多数在茧内潜伏4~8 d,晴天陆续破茧爬出。出茧时成虫在茧的顶部(头部所在的一端)环状咬成直径2 mm的圆形盖,最后用头部顶开茧顶部盖,依靠胸足从茧内爬出,成虫从咬茧至爬出约需20 min。3月下旬成虫进入羽化高峰期,此时正值天水市油菜花初花期,杏开花盛期。

成虫出茧后分泌深绿色分泌物,并开始爬行、飞翔,寻找芽尖;在芽鞘上端,调转身体,头部朝向枝基,尾部朝向枝梢,选择适宜的产卵部位后,产卵器刺入嫩芽组织产卵。一般在阳光明媚的上午产卵,每次产卵约经过20 min,每产一粒卵约5~10 s;产卵中途有间歇,间歇时头腹左右摇摆约1.5 min,之后又接着产卵,产完继续摇摆约2 min,雌虫也常重复同一动作才能完成产卵。卵常产于芽内中心的两片叶上的叶片背面主脉一侧,每叶常有卵孔约10个,卵自叶尖向下呈单、双虚线状排列于叶肉。解剖芽尖可见每芽尖内一般有卵1~2粒,最多为3粒,故雌成虫的所有产卵动作并非都在产卵。

卵期 初产卵乳白色,多数灰黑色,部分弯曲、个别较直,遗腹卵有66粒,3月上旬成虫羽化并开始产卵,3月中旬幼虫开始孵化,3月下旬、4月上旬为孵化盛期。

幼虫期 幼虫期的物候是紫丁香开花初期至油菜开花期行将结束时。幼虫在3月下旬开始孵化取食,4月中旬幼虫部分开始老熟结茧,5月上旬幼虫全部老熟入土结茧。幼虫危害时于芽心自上而下取食,并排出黑褐色颗粒状虫粪,然后将整个芽心取食一空,再自芽心蛀孔爬出、入土做茧。

4 防治方法

物理防治 在幼虫入土后至出土前,采用树冠下覆土或者清理树盘下的枯枝落叶、并深翻土壤可压低虫口基数。

生物防治 保护和利用天敌昆虫,该虫幼虫期常被突角卷唇姬蜂^[2] *Aptesis corniculata* Sheng 单寄生(内寄生),寄生率达3.5%~7.2%。此外,天敌还有步甲、蜘蛛等。

化学防治 4月上旬对低龄幼虫采用1.8%阿维菌素乳油2 000倍液或用25%灭幼脲3号胶悬剂2 000倍液防治,防效分别达92.8%和95.2%;4月(下转第95页)

- Memphis, Tenn: Southern Lumberman, 1941. 46.
- [3] Sargent C S. Manual of the tree of North America (exclusive of Mexico) [M]. Boston and New York: Houghton Mifflin Co. 1933. 910.
- [4] Burns D P. Insect enemies of yellow-poplar [J]. USDA For. Serv. Res. Pap., 1970, 159: 15.
- [5] Burns D P, Lester P G. The leaf-mining weevil of yellow-poplar [J]. Can. Entomol., 1968, 100(4): 421-429.
- [6] Hay C J. Life history and control of a foot collar borer (*Euzophora ostricolorella* Hulst.) in yellow-poplar [J]. J. Econ. Entomol., 1958, 51: 251-252.
- [7] Schuder D L, Schuder R L Giese. *Euzophora ostricolorella* Hulst (Lepidoptera, Phycitidae), a root collar borer of tuliptree [J]. Ind. Acad. Sci. Proc. 1962, 71: 122-123.
- [8] Byler J W, Byler R P True. Root and butt rot in young yellow-poplar stump sprouts [J]. Phytopathology. 1966, 56: 1061-1097.
- [9] McCarthy E F. Yellow-poplar characteristics, growth, and management [J]. U. S. Dep. Agric. Tech. Bull. 1933. 356: 58.
- [10] True R P. Decay in thinned sprout clumps of yellow-poplar. (Abstr.) [J]. Phytopathology, 1962, 52(5): 486.
- [11] True R P, True E H, Tryon B. Decay in yellow-poplar sprouts in West Virginia [J]. W. Va. Univ. Agric. Exp. Stn. Bull., 1966, 541: 67.
- [12] Roth E R. Top rot in snow-damaged yellow-poplar and basswood [J]. J. For., 1941, 39: 60-62.
- [13] Toole E R. Rot entrance through dead branches of southern hardwoods [J]. For. Sci., 1961, 7: 218-226.
- [14] Nelson R M. Vigorous young yellow-poplar trees can recover from injury by *Nectria cankers* [J]. J. For., 1940, 38: 587-588.
- [15] Dochinger L S, Dochinger C E. Fusarium canker found on yellow-poplar (Abstr.) [J]. Phytopathology, 1962a, 52: 8.
- [16] Dochinger L S, Carl C E. Fusarium canker found on yellow-poplar [J]. J. For., 1962b, 60: 331-333.
- [17] Kelman A, Guy V G. A root and stem rot of yellow-poplar caused by *Cylindrocladium scoparium* [J]. U. S. Dep. Agric. Plant Dis. Rep., 1965, 49(9): 797-801.
- [18] Kelman, Arthur, Guy V. Gooding Jr, G K Slocum. Cylindrocladium root rot of yellow-poplar [J]. J. Elisha Mitchell Sci. Soc., 1959, 75: 66-67.
- [19] Olson D F. Silvical characteristics of yellow-poplar (*Liriodendron tulipifera* L.) [J]. USDA For. Serv. Res. Pap., 1969, SE-48, 16.
- [20] McCarthy E F. Yellow poplar characteristics, growth, and management [J]. U. S. Dep. Agric. Tech. Bull. 1933, 356: 58.
- [21] Harlow R F, Harlow L K. Response of yellowpoplar and dogwood seedlings to clipping [J]. H. Wildl. Manage., 1972, 36: 1076-1080.
- [22] Della B L, Frank M J. Effect of an intensive cleaning on deer-browse production in the Southern Appalachians [J]. J. Wildl. Manage., 1965, 29: 729-733.
- [23] Harlow R F, Robert L D. Deer browsing and hardwood regeneration in the southern Appalachians [J]. J. For., 1970, 68: 298-300.
- [24] Russell T E. Animal depredations on spot-seeded yellow-poplar in central Tennessee [J]. USDA For. Serv. Res. Note 1973, SO-148, 4.
- [25] Sluder F R, Richard C R. Yellow-poplar direct seeding in the North Carolina Piedmont [J]. USDA For. Serv. Res. 1964, Note SE-25, 2.
- [26] Trimble G R. Response to crop-tree release by 7-year-old stems of yellow-poplar and black cherry [J]. USDA For. Serv. Res. Pap. 1973b, NE-253, 10.
- [27] Smith H C, Lamson N I. Grapevines in 12-to 15-year-old central Appalachian hardwood stands. In Impact of inflation on the management and utilization of hardwoods. Third. Annu [J]. Hardwood Symp. Hardwood Res. Counc. Proc. Cashiers, 1975, N. C. 145-150.
- [28] Trimble G R, Tyron E H. Grapevines a serious obstacle to timber production on good hardwood sites in Appalachia [J]. North. Logger and Timber Process. 1974, 23(5): 22-23, 44.
- [29] McGee C E, Ralph M. H. Regeneration after clearcutting in the Southern Appalachians [J]. USDA For. Serv. Res. Pap. 1970, SE-70, 12.

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中、下旬利用3%高渗苯氧威4000倍液进行喷雾防治,防效达96.7%。

参考文献:

- [1] 萧刚柔,黄孝运,周淑芷,等.中国经济叶蜂志(I)[M].陕西杨陵:天则出版社,1992. 119-131.
- [2] 盛茂领,武星煜.寄生柳丝角叶蜂的卷唇姬蜂属一新种(膜翅目:姬蜂科)[J].昆虫分类学报,2003,25(2): 148-150.
- [3] Liston, Andrew D. A new species of *Phyllocolpa* Benson *Phyllocolpa rolleri* sp nov (Hym.: Tenthredinidae, Nematinae) on *Salix hastate* [J]. Entomologist's Record and Journal of Variation, 2005, 117(5): 183-185.
- [4] Hochwender Cris G, Janson, Eric M, Cha, Dong Ho, et al. Community structure of insect herbivores in a hybrid system: examining the effects of browsing damage and plant genetic variation [J]. Ecological Entomology, 2005, 30(2): 170-175.
- [5] den Herder, Michael, Virtanen, Risto, Roininen, Heikki. Effects of reindeer browsing on tundra willow and its associated insect herbivores [J]. Journal of Applied Ecology, 2004, 41(5): 870-879.
- [6] Kopelke, Jens-Peter. Gall-forming Nematinae, their willow hosts (*Salix* spp.) and biological strategies (Insecta, Hymenoptera, Symphyta, Tenthredinidae, Nematinae: *Euura*, *Phyllocolpa*, *Pontania*) [J]. Senckenbergiana Biologica, 2003, 82(1-2): 163-189.