BIOLOGICAL CONTROL

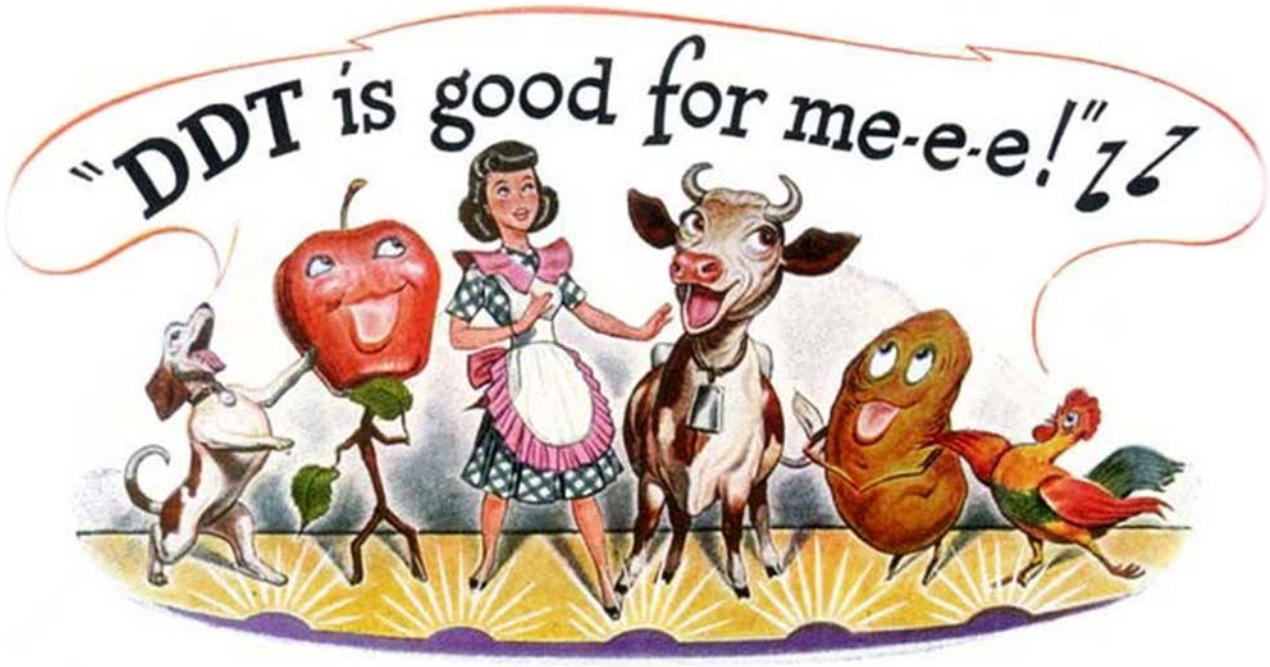
“FROM PAST TO PRESENT”

IN TURKEY

MSc. Dogancan KAHYA
Bıological Control Research Instıtute Adana /Turkey
dogancan.kahya@tarim.gov.tr

T.C.
GIDA TARIM VE HAYVANCILIK
BAKANLIĞI

- After World War II, chemical pesticides were started to be used against pests and diseases in agriculture.
- Success of pesticides have spread among the world rapidly.
- However, negative effects of pesticides on human health and environment were started to emerge globally.



- Environmental degradation and changes in ecosystems caused to become awareness among people in terms of pesticides.
- Especially, poisoning and death have increased because of pesticides during 1950s and 1960s.
- These pesticides cause many problems;
  - Phytotoxicty for plants,
  - Damage to beneficial and other organisms,
  - Resistance
  - Environmental degradation
  - Damage to human health.
- "Silent Spring" was one of the key factor for reducing and banning of chemical globally.

'Silent Spring' Is Now Noisy Summer

Pesticides Industry Up in Arms Over a New Book

Rachel Carson Stirs Conflict—Producers Are Crying 'Foul'

By JOHN M. LEE

The $300,000,000 pesticides industry has been highly irritated by a quiet woman author whose previous works on science have been praised for the beauty and precision of the writing.

The author is Rachel Carson,

fending the use of their products. Meetings have been held in Washington and New York. Statements are being drafted and counter-attacks plotted.

A drowsy midsummer has suddenly been enlivened by the greatest uproar in the pesticides industry since the cranberry

WHY BIOLOGICAL CONTROL ?

CATEGORY	BIOLOGICAL CONTROL	CHEMICAL CONTROL
Negative Effects On Environment And Human Health	NO NEGATIVE EFFECT	MANY NEGATIVE EFFECTS
Resistance to Pests	NO RISK	HIGHLY RISK
Phytotoxic effects	NO	YES
Waiting Period	NO	YES
Sustainability of Applications	SUSTAINABLE	NOT SUSTAINABLE
Economic	ECONOMİC	NOT ECONOMIC

HISTORY OF BIOLOGICAL CONTROL IN TURKEY

- First record official Biological Control application was in 1912.
- *Rodolia cardinalis* was brought from Chios Island and used against *Icerya purchasi*.
- This predator was brought again in 1932. After that, the release studies have been started in Aegean and Mediterranean region.
- This was the first successful classical biological control application in Turkey. *Rodolia cardinalis* established our nature and suppressed *Icerya purchasi* easily.
- If wide spectrum pesticides is not applied, this predator can be used effectively

Adult *Rodolia cardinalis*

Icerya purchasi

- *Aphelinus mali* was the second beneficial organism imported from abroad and used against apple woolly aphid by Prof. Dr. Süreyya ÖZEK in 1912 (Classical Biological Control).
- This parasitoid was also adapted to our environment and used successfully against *Eriosoma lanigerum.*

Eriosoma lanigerum

Aphelinus mali

- *Bracon hebetor* was also imported to control Lepidoptera species in storage process.
- *Prospaltella berlesei* was used against white peach scale insect in fruit orchards.
- *Prospaltella perniciosi* was an another imported parasitoid used against San Jose scale insect.

Bracon hebetor

Prospaltella berlesei

- *Cryptolaemus montrozieri*, and *Leptomastix dactylopii* have been using against citrus mealybug since 1965.
- This predator and parasitoid were imported from California in 1965 and started to be mass-reared in Adana and Antalya via Biological Control Research Station.
- 3.000.000 predator and 4.600.000 parasitoid have been released in Cukurova in 2003. After that, mass-rearing of this parasitoid and predator have been transferred to the private sector in 2004.

Cryptolaemus montrozieri

Leptomastix dactylopii

- Biological Control Research Institute has released 36.000.000 predator and 60.000.000 parasitoid between 1965-2003
- 48.000.000 predator and 75.000.000 parasitoid has been released on citrus orchards via the private sector.
- Western Mediterranean Agricultural Research Institute (Antalya) has released 40.000.000 predator and 54.000.000 parasitoid between 1965- 2016.
- Biological Control applications in citrus are supported by our Ministry, and these supports provides long term sustainability for IPM.

- *Eretmocerus debachi* were imported from USA and used against *Parabemisia myricae* in Cukurova region.

- This parasitoid suppressed *Parabemisia myricae* and established to our environment successfully.

Japanese bayberry whitefly pupal stage

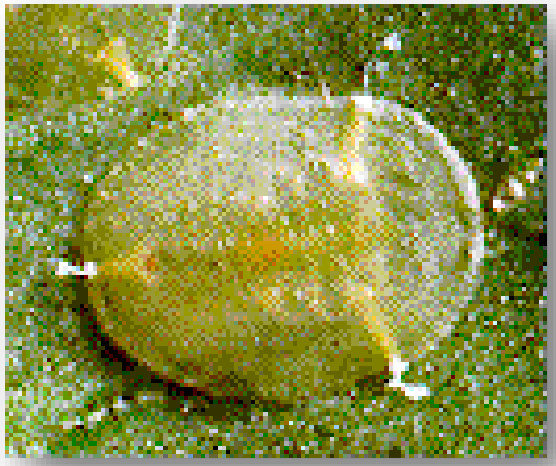
Eretmocerus debachi

- Citrus Woolly whitefly, *Aleurothrixus floccocus*, entered to Turkey from Hatay and caused important damage on citrus.
- Parasitoid *Cales noacki* entered with this pest and were seen in Hatay in 1994.
- This parasitoid have been mass-reared and released in Eastern Mediterranean Region by Biological Control Research Institute.
- Release studies helped to increase parasitoid population and suppressed this pest effectively.

Cales noacki

Damage of citrus woolly whitefly

- *Serangium parcesetosum* were brought from Eastern Blacksea Region, Georgia in 1990 and used against citrus Whitefly, *Dialeurodes citri*, in citrus orchards in 1990s via Adana Biological Control Research Institute.
- This predator was firstly established in Cukurova region. After that, it was also used in western Mediterranean and Aegean Region.



Pupal stage of *Dialeurodes citri*

Adult *Serangium parcesetosum*

- This predator adapted to our environment and suppressed the damage of citrus whitefly successfully.
- Thanks to establisment of this predator, citrus whitefly is not main pest for citrus anymore.

Larvae and pupa of *S.parcesotosum*

Adult *Serangium parcesetosum*

- Egg parasitoid *Trichogramma evanescens* have been started to mass reared in Adana Biological Control Research Institute since 1996 and used against European corn borer, *Ostrinia nubilalis.*
- Release studies have been done in 20.000 da from 1996 to 2007.

Trichogramma evanescens

Parasitized and non-parasitized *Ostrinia nubilalis* eggs and adult individual

- *T. evanescens* is mass-produced commercially in our Institute.
- This parasitoid has been released successfully against *Lobesia botrana* in Denizli with partnership of the private sector and our institute between 2014-2015.
- 1.500.000 *T.evanescens* have been released against *L. botrana* in 2016.
- 7.500.000 parasitoid has been released for the support and conservation of this parasitoid in nature.
- The release of *T.evanescens* is still being continued against *Lobesia botrana* and *Cydia pomonella* with different studies.

•Egg parasitoid *Trissolcus semistriatus* is mass-produced and used against sunn pest in Adana Biological Control Research Institute.

•85.000.000 parasitoids have released between 2007-2016.

•In addition, Conservation studies, such as green zone, have been done for protection and increase of this parasitod's population.

Sunn pest eggs and adult

Adult *Trissolcus semistriatus* and sunn pest eggs

- The release studies are completely supported by our Ministry and Biological Control Research Institute.
- Thanks to Release studies and banning of Aerial spraying with plane, parasitism rate have increased from %20-25 to %80-90 since 2006.

•Our Institute do not only support biological control studies, but also conduct some studies about conservation of natural enemies.

• Especially “Green Zone” is one of the most important factor to protect natural enemies. In addition, polyculture plantation is supported by our institute.

•For example Green Zone Project in Beydagı was helpful for conservation and spread of sunn pest parasitiod.

Beydağı Green Zone Project

- Many biological control agents are commercially used in greenhouse vegetable production with officially authorized by General Directorate by Food and Control.
- Biological control applications is supported 3500 ₺/ ha financially by our ministry.
- List of officially registrated natural enemies used in greenhouse vegetable production:
  - *Aphidius colemani*, *Aphidius ervi*, *Orius laevigatus*, *Amblyseius swirskii*, *Eretmocerus eremicus*, *Macrolophus caliginosus*, *Nesidiocoris tenuis*, *Encarsia formosa*, *Phytoseiulus persimilis*, *Diglyphus isae*

WHAT WE DO IN BIOLOGICAL CONTROL RESEARCH INSTITUTE NOW ?

Mass production of scale Insect Predators

***Aspidiotus nerii*)**

Chilocorus bipustulatus

Rhyzobius lophanthae

Mass-production of *Serangium parcesetosum*

Adult whitefly

***S. Parcesotosum* larvae**

Adult *S. Parcesotosum*

Mass-production of citrus mealybug Parasitoids: *Anagyrus pseudococci* and *Leptomastix dactylopii*

Citrus melaybug individuals

Anagyrus pseudococci

Leptomastix dactylopii

Mass-production of citrus mealybug predators; *Cryptolaemus montrouzieri*, *Scymnus* sp., *Nephus* sp., *Sympherobius* sp.

Scymnus sp.,

Sympherobius sp

Cryptolaemus montrouzieri **adult and larvae**

Nephus **sp.**

Mass-production of *Chrysoperla carnea*



***Chrysoperla carnea* larvae, pupa, and adult**

• *Orius* laevigatus is also mass-produced in our Institute

•This predator is used commercially against thrips in greenhouse vegetable production in Turkey

Orius laevigatus adult and nymph

Mass production of *Anthocoris minki* against psyllids

***Anthocoris minki* nymph and adult**

•*Aphidius colemani* is mass-produced in our Institute.

•This parasitoids is used against aphids commercially in greenhouse vegetable production

***Aphidius colemani* adult and parasitised aphid mummy**

• Predator acar *Amblyseius swirskii* is also mass-produced in our Institute.

• This predator also used commercially against thrips and whiteflies in greenhouse vegetable production..

***Amblyseius swirskii* adult**

SIDE EFFECT TRIALS

• Adana Biological Control Research Institute has been carrying out “Side effect trial” with permission of Republic Of Turkey Ministry Of Food, Agriculture And Livestock since 2008.

• Side effect trials is an obligation for getting registration for insecticide of citrus pest .

•Pesticide companies must apply "side effect trials" before obtain registration from our ministry.

•Three natural enemies is used in these trials;

- •*Chilocorus bipustulatus*
- •*Angyrus pseudococci*
- •*Amblyseius swirskii*

BIOLOGICAL CONTROL IN MEDIA

SABAH GÜNEY
Bölgenin güçlü sesi
18 Mayıs Çarşamba
SABAH'IN ÜCRETSİZ EKİDİR

Faydalı arıcıklar süne ile savaşıyor

BUĞDAY ambarı Çukurova Bölgesi'nde, buğday zararlısı süne ile mücadeleyi faydalı arıcıklar yürütüyor. Biyolojik Mücadele Araştırma Enstitüsü Müdürlüğü ile Adana Ticaret Borsası tarafından 2009 yılından beri ortaklaşa sürdürülen "Süne'de Biyolojik Mücadele" çalışması kapsamında Bölgenin buğday alanlarında son olan Süne, son yıllarda olduğu gibi bu yılda hiç ilaç uygulanmadan kontrol altına alındı. Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü'ne (TAGEM) bağlı enstitü uzmanlarından Vahdettin Akmeşe, Çukurova Bölgesi'nde önceden belirlenen buğday alanlarına Süne'ye karşı her yıl 300 bin ile 450 bin faydalı böcek (arıcık) salımı yapılarak bölgede zararlının hiç ilaç kullanmadan yüzde 90-95 oranında kontrol edilebiliğini söyledi. Enstitü Müdürü Dr. Naim Öztürk ise, Süne'nin ülkemizin birçok yöresinde buğdayın ana zararlısı olduğunu, mücadele yapılmadığı takdirde ürünün kalite ve kantitesinde önemli zarar oluşturduğunu söyledi. Öztürk, "Biyolojik Mücadele" çalışmalarının bakanlık tarafından desteklenerek yaygınlaştırılması konusunda büyük çaba sarf edildiğini ve bu çalışmanın da bunun bir sonucu olduğunu ifade etti.

KONTROL ALTINDA

Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü'ne (TAGEM) bağlı enstitü uzmanlarından Vahdettin Akmeşe, Çukurova Bölgesi'nde önceden belirlenen buğday alanlarına süneye karşı her

www.tg.com.tr
23.5.2016 Pazartesi
Türkiye

Süne'ye karşı biyolojik mücadelede kullanılan faydalı böceklerin, Süne yumurtalarını yüzde 95 oranında parazitleyerek yok ettiği belirtildi.

Buğdayda "Süne" sorununa ilaçsız çözüm

Biyolojik Mücadele Araştırma Enstitüsü Müdürü Dr. Naim Öztürk, Türkiye'de 2004 yılından beri uygulanan 'Süne'de Biyolojik Mücadele' çalışmalarıyla doğaya yaklaşık 50 milyon faydalı arıcık salındığını söyledi.

Biyolojik Mücadele Araştırma Enstitüsü Müdürlüğü ile Adana Ticaret Borsası arasında 2009 yılından beri ortaklaşa sürdürülen "Süne'de Biyolojik Mücadele" çalışması kapsamında Bölgenin buğday alanlarında son olan Süne, son yıllarda olduğu gibi bu yılda hiç ilaç uygulanmadan kontrol altına alındı. Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü (TAGEM)'ne bağlı Biyolojik Mücadele Araştırma Enstitüsü uzmanlarından Vahdettin Akmeşe, Çukurova Bölgesi'nde önceden belirlenen buğday alanlarına Süne'ye karşı her yıl 300.000 ile 450.000 faydalı böcek (arıcık) salımı yapılarak bölgede zararlının hiç ilaç kullanmadan yüzde 90-95 oranında kontrol edilebiliğini söyledi. Enstitü Müdürü Dr. Naim Öztürk ise, Süne'nin ülkemizin birçok yöresinde buğdayın ana zararlısı olduğunu, mücadele yapılmadığı takdirde ürünün kalite ve kantitesinde önemli zarar oluşturduğunu söyledi. Dr. Öztürk, Türkiye'de 2004 yılından beri uygulanan 'Süne'de Biyolojik Mücadele' çalışmalarıyla farklı illerde doğaya yaklaşık 50 milyon faydalı arıcık salındığını belirtti.

Hürriyet
13 Ağustos 2016 Cumartesi
www.hurriyet.com.tr

Üzüm bağlarının koruyucusu avcı böcekler

■ MANİSA Saruhanlı'da faaliyet gösteren Özgür Tarım Ürünleri A.Ş., üzüm salkımlarına ciddi zarar veren salkım güvesine karşı kimyasal ilaçlar yerine avcı böceklerle mücadele başlattı. Firma, Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü'ne bağlı Adana Biyolojik Mücadele Araştırma Enstitüsü Müdürlüğü ve Dilbaz Gıda Tarım Ürünleri ile işbirliği yaparak buralardan biyolojik mücadelede faydalı bir arıcık olan 'Trichogramma evanescens'i temin etti. Avcı böcekleri bağlarına salan şirket, bu sayede doğada zararlı olan canlıları tamamen yok etmeden ekolojik dengeyi koruyucu, onarıcı ve destekleyici önlemler almaya başladı.

KALINTI SORUNU KALKTI

Özgür Tarım Ürünleri A.Ş. Proje Müdürü Ali Altun, "Böcekler sayesinde kimyasal ilaçlama yapılmayacağından ihracatın önündeki kalıntı sorunu da ortadan kalkacak. Bu sayede eskisi gibi dünyanın en kaliteli üzümünü üretip, en temiz üzümünü satan bir ülke konumuna geleceğiz" dedi. ■ Ersan ERDOĞAN

THANK YOU FOR ATTENTION

MSc. Dogancan KAHYA
Bıologıcal Control Research Instıtute
E-mail: dogancan.kahya@tarim.gov.tr

T.C.
GIDA TARIM VE HAYVANCILIK
BAKANLIĞI